

# TECHNOLOGY DEPT American Aviation

MANAGEMENT  
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PRODUCTION  
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EQUIPMENT

## MARCH 29

1954

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Defense Department has apparently taken another look at progress in atomic powered aircraft development. Gen. Nathan Twining, Air Force Chief of Staff, now says we "ought to be able to produce an atomic-powered airplane in a few years."

This time last year Defense Secretary Wilson told Congress it was too early to develop an atomic airplane, that an A-plane designed on the basis of existing technical information would be "a bum airplane . . . so heavy it wouldn't fly fast."

Despite apparent discrepancy in two statements, Wilson's cuts in atomic aircraft development funds may have accelerated program by de-emphasizing aircraft developments in favor of powerplant activity. Insiders claim relatively routine airframe development, moving at too fast a pace, was putting engine designers in a design "straightjacket."

Boeing, Convair and Lockheed have airframe design studies for the atomic powered aircraft. Pratt & Whitney and General Electric have powerplant programs.

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Key to reorganized Federal airport aid program is the increased discretionary fund (see story on page 16). Large airports with military potential in vital defense areas will get funds. Transportation Council approved program with reservations while requesting a Commerce study of user charges at private and public airports, including military charges. Aim is to get bill out of Budget Bureau in time for Senate hearings to forestall supplemental request.

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Boeing's 707 jet transport is causing the other U. S. transport manufacturers genuine concern. Design is well-balanced compromise to fit known and projected requirements within scope of engine power availability—the 10,000 pounds thrust of the P&W J57—determining gross weight, speed, and range.

Best estimates are that Boeing has a good two-year lead in this category.

Recovery of the Ghost jet engines from the BOAC Comet which crashed off Italy may deal hard blow to the Comet. Official report states turbine disc of one engine is missing and urges caution in jumping to conclusions. Fear that a failed turbine wheel might tear apart the wing has been major criticism of Comet design.

Meanwhile both UAT and BOAC have resumed scheduled Comet flights after extensive modifications.

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With more than 50 helicopter applications pending, CAB has warned the industry it will weigh the heavy subsidy requirements of existing services and the appropriateness of further increasing the subsidy bill before granting new certificates. Further, CAB warned it will make "a periodic re-evaluation of the helicopter experiment" to assess subsidy requirements and benefits.

Helicopter subsidy bill for fiscal 1955 is projected at \$2,563,000 for the three operators—Los Angeles Airways, N. Y. Airways, and Helicopter Air Service (Chicago). Service rate for helicopters is \$2.58 per ton-mile.



# The Washington View

## The Navy Moves Up

Although Roger M. Kyes' resignation as Deputy Secretary of Defense does not take place until May 1, his successor and his successor's successor have been named. The question that has arisen is "How long will the policies last that Kyes has laid down for the armed services once the new hands take over?" Both men who are moving up in what amounted to promotion from the ranks are distinctly naval persons.

Kyes' immediate replacement is to be Robert B. Anderson, who moves over from the Navy secretaryship. Picked to succeed Anderson in the top Navy post has been Charles S. Thomas, currently Assistant Secretary of Defense but who entered the Eisenhower Administration first as Assistant Secretary of Navy. Thomas is particularly known as a partisan of the naval air arm.

A familiar complaint in the Pentagon has also been revived. The Navy, the other two services rightfully claim, has surrounded the Defense Secretary with its partisans.

## A Look at the New Look

The raging controversy over the "new look" in military planning, which has been with us since the Administration unveiled its program, is apparently never to be settled to the satisfaction of all. Now the term itself has become the subject of debate as well as the policies involved. Last week the air was somewhat cleared as Administration spokesmen publicly re-explored the program.

The first and most helpful accomplishment came with the discrediting of the much-abused phrase "new look." The military "new look" turned out not to be so new after all. It was best summed up by Defense Secretary Charles Wilson, who said the Administration's basic viewpoint is expressed as "trimming our defense expenditures to a scale that can be maintained over an extended period of time."

Wilson asserts that it has been a natural evolution from previous policy, the change coming from the development and availability of atomic weapons and the need for cutting the government's expense.

This evolutionary change was aptly attested by the Joint Chiefs only last week before the Senate Appropriations Committee.

Chairman Adm. Arthur Radford said he was convinced that any other administration would have done the same.

The fiscal 1955 military budget, it was said, will mean more atomic weapons, more aircraft to deliver them, and less fighting manpower on the ground. The latter was phrased by the Defense Secretary as "the economy in forces principle," which he said is demonstrated by reliance on more and more modern airpower.

Wilson has indicated that airpower will claim a greater share of the defense budget in the future. Thus the Air Force's growth is projected to 137 wings by 1957 as compared with the present 110 wings. This will also mean, of course, the Army and Navy can be expected to be curtailed as the air is exploited.

## First Dissent

Gen. Ridgway, Army Chief of Staff, was the first to dissent from the proposed defense budget, which he said was imposed on the Army. However, he did say he accepted the decision and would carry it out as best he could. On the other hand, Gen. Twining and Adm. Carney, Air Force and Navy Chiefs, readily approved the program. Ridgway dissented from the first definite break in the "balanced forces" concept which has meant a three-way split between the services since 1947.

Further clarification of the overall picture was made by JCS Chairman Adm. Radford. He tempered the single force theme, though, which had begun to gain some headway in certain quarters through misinterpretation. He told the Senate Committee emphatically that "our defense policy does not depend solely on massive retaliation with atomic weapons." We are not "relying exclusively on one weapon or one service," Radford declared.

The admiral also did much to clarify the disputed January speech made by Secretary of State Dulles. The Secretary has said that the U. S. now was seizing the initiative in the cold war by letting the enemy know that we will use massive retaliation with atomic weapons, on places of our own choosing, if we should be attacked.

## Maybe Not the Atom

The wrong inferences had been drawn from Dulles's statement, Radford said. "Actually what we are doing is serving notice that if they hit us at one place, we might hit them somewhere else, and not necessarily with atomic weapons, and that gives us the initiative."

Dulles also went to great lengths to explain what he had meant. He denied that the application of the new policy would be all out war or nothing but said that the uncertainty over when, where, and how the retaliation would come is the key to the success of the policy.

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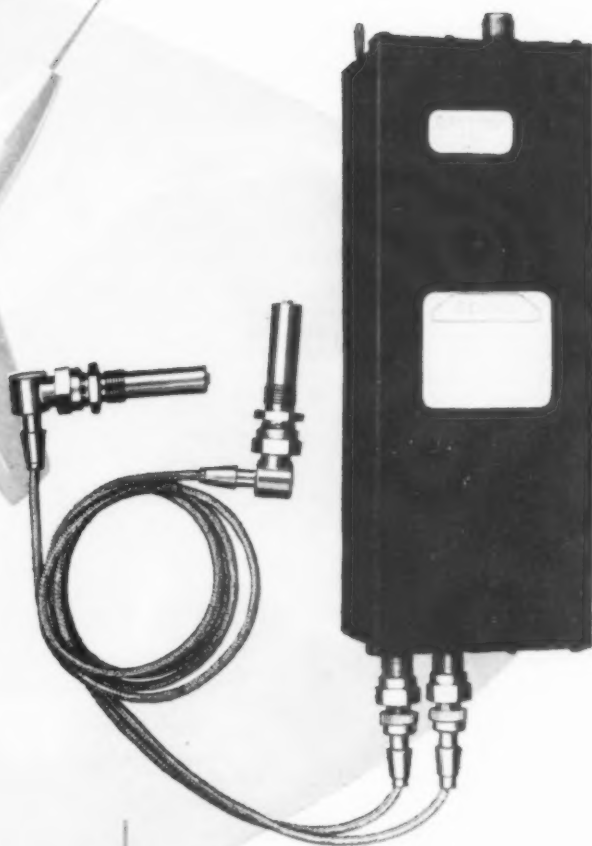
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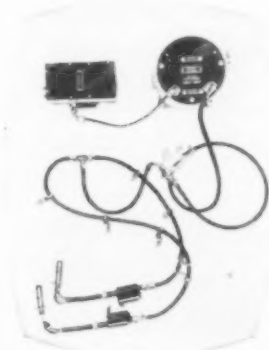
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### OTHER PUBLICATIONS . . .

American Aviation Daily, a daily news service for the entire industry. \$200 per year. Managing Editor: Keith Saunders.

American Aviation Directory, twice yearly listing of products, people and organizations. \$7.50 each. Managing Editor: Marion E. Grambow.

Official Airline Guide: Monthly publication of airline schedules and fares. \$13.50 per year in USA; \$14.00 in Canada; \$18 elsewhere. Published from 139 N. Clark St., Chicago 2, Ill. Central 6-5804. Managing Editor: Robert Parrish.

American Aviation Traffic News (Incorporating Air Tariff Reports): Daily rates and tariff news. \$150 per year. Managing Editor: Wallace I. Longstreth.

## When & Where

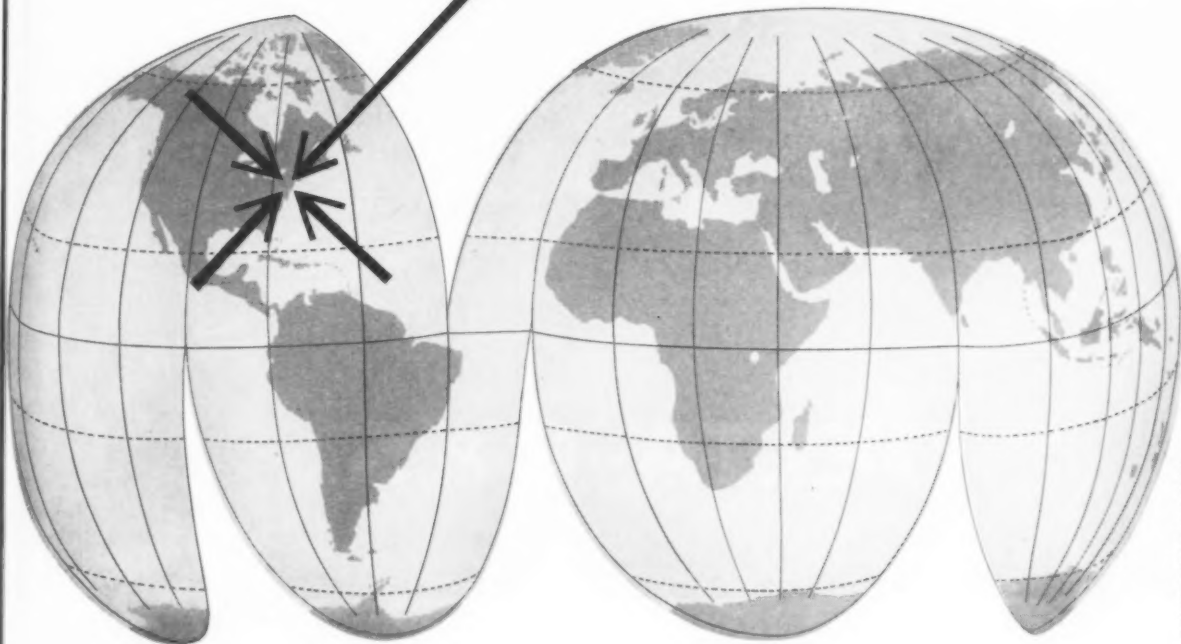
- Apr. 5-7—Air Transport Assn., Ticketing & Baggage Committee, Paradise Inn, Phoenix, Ariz.
- Apr. 5-8—American Management Assn., 23d National Packaging Exposition, Convention Hall, Atlantic City, N. J.
- Apr. 5-9—Air Transport Assn., Chief Pilots Mtg., Dallas Hotel, Dallas, Texas.
- Apr. 12-14—Airport Operators Council, 7th Annual Meeting, Tampa, Fla.
- Apr. 12-15—Society of Automotive Engineers, Aeronautic Meeting, Production Forum & Aircraft Engineering Display, Statler Hotel, New York.
- Apr. 14—Nat'l Advisory Committee for Aeronautics, symposium on helicopter research for American Helicopter Society, Langley Field, Va.
- Apr. 19-20—Symposium on automatic production of electronic equipment, sponsored jointly by Stanford Research Institute and USAF, Fairmont Hotel, San Francisco, Calif.
- Apr. 21-23—Air Line Pilots Assn., 2d Annual Air Safety Forum, Chicago.
- Apr. 21-24—2d Annual Student Paper Competition sponsored by Institute of the Aeronautical Sciences, Texas Section, Adolphus Hotel, Dallas.
- Apr. 22-23—Radio Technical Commission for Aeronautics, Franklin Inst. Laboratories Inst. of the Aeronautical Sciences (Philadelphia Section), & Inst. of Radio Engineers (Phila. Section), Joint Meeting, Franklin Institute, Philadelphia.
- Apr. 22-23—American Inst. of Electrical Engineers, conference on feedback controls, Claridge Hotel, Atlantic City, N. J.
- Apr. 24-25—Air Force Assn., California Wing, 7th Annual Convention, Hotel Miramar, Santa Monica, Calif.
- April 27-28—Air Traffic Conference, semi-annual meeting, Algiers Hotel, Miami Beach, Fla.
- Apr. 27-29—Aviation Lighting Committee, Illuminating Engineering Society, technical conference, Milwaukee, Wis. Details from R. J. Stefany, Westinghouse Lamp Div., Bloomfield, N. J.
- Apr. 27-30—Air Transport Assn., Purchasing Committee, Clift Hotel, San Francisco.
- Apr. 29-30—American Society of Tool Engineers, 10th biennial industrial exposition, Convention Center, Philadelphia.
- May 5-7—3d Int'l Aviation Trade Show, sponsored by Aircraft Trade Shows, Inc., 71st Regimental Armory, New York.
- May 6-8—Fourth IAS West Coast Student Conference, Los Angeles.
- May 6-8—First Annual IAS West Coast Industry-Faculty Conference, Los Angeles.

## INTERNATIONAL

- Apr. 5-6—Society of Plastics Industry (Canada) Inc., 12th annual conference, Mount Royal Hotel, Montreal.
- Apr. 21—ICAO Conference on coordination of air transport in Europe, Strasbourg, France.
- Apr. 26-May 8—IATA Technical Conference on Training, Barcelona, Spain.
- May 11—ICAO Special Communications mtg., Middle East Region, location to be announced.
- May 12-14—Engineering Institute of Canada, Annual Meeting, Quebec.
- May 31-June 11—Canadian International Trade Fair and National Air Show, Toronto.
- June 1—ICAO Assembly, 8th session, Montreal.
- June 15—ICAO Meteorological Division, 4th session, Montreal.

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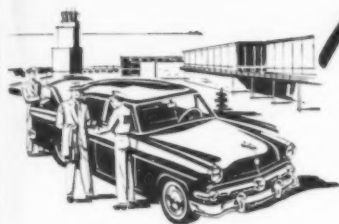
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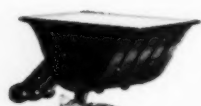


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## Editorial

### Kyes and the AF

WHEN Roger M. Kyes steps down May 1 as Deputy Secretary of Defense, after serving 14 months, the Air Force loses a strong friend.

Unless today's signs are wrong, history will record that Kyes not only understood the essential elements of air power but did as much as any man in this period, perhaps more, to push through the recent approval of 137 AF wings by June, 1957.

When Kyes first arrived in Washington he was quickly dubbed a "hatcheteer." The press, generally, was critical, or at least highly skeptical. But Kyes went after facts, worked tirelessly, paid no heed to idle gossip and had no time for men in the Pentagon who didn't know their business.

Most significant of all, the attitude of the military heads themselves changed toward Kyes. This was particularly true in the Air Force.

Bud Baer, this magazine's staff member assigned to the Pentagon, sums it up this way: "There is no question that Kyes was responsible in a great way for the 137 wings. This comes from indisputable sources who maintain intimate and almost daily contact with the former General Motors No. 2 man. Had it not been for Kyes' work in this respect, the AF today would probably be working toward 10 less wings by mid-1957."

Mr. Kyes' achievements have been considerable in a short time. It is unfortunate that men of his caliber can't stay longer in government service.

### Mail For the Locals

Having criticized the Post Office Department rather severely in this space last issue for its trend toward retrogression in handling trunk and international airline mail problems, we have nothing but praise for the Department in its decision to use three local service air carriers for carriage of first class mail for an experimental period.

Credit must also go in large measure to Donald W. Nyrop, former CAB Chairman, who is now counsel for the Conference of Local Airlines. It was Nyrop who persuaded the P.O. Department to use local carriers for expediting mail during the Christmas holidays. But the new program for utilizing Central, North Central, and Frontier is truly setting a precedent which is writing aviation history.

Not the least important item is the decision to carry newspapers as well as first class and other preferential mail.

It is a good deal for both local carriers and the Department. For the carriers it means 30¢ a ton-mile additional revenue. For the P.O. Department it means an amazingly low transportation cost.

P.O. cost ascertainment report for fiscal 1952, the latest available, shows that out of every expense dollar, the P.O. spent 20.8¢ for transportation. Now look what the P.O. is getting from the trunkline and the local carrier first class mail experiments.

For an 87-day period up to December 31, westbound Washington-Chicago, the trunks received 5.72¢ of each dollar of the total gross revenue collected by the P.O. from the sale of stamps, as against a national transportation average of 20.8¢. (P.O. figured its revenues at \$477,688, and it paid the trunk airlines \$27,343.)

For the eight-day Christmas period, the local carriers received only 2.84¢ of each dollar of the P.O. gross revenue, just about half the pay received by the trunks, and only a fraction of the average national transportation cost. (P.O. figured its gross revenues at \$520,010 and it paid the local carriers \$14,806.)

With the airlines, the P.O. is buying only actual lift. In railway mail cars and trucks, it pays for a certain amount of space, whether or not this space is used in its entirety.

We think the use of local carriers for first class mail carriage is a highly constructive forward step, one which will be met with eager response throughout the country. Not only is it faster, but it's cheaper. Let the movement spread.

### Red Tape Herds

The other day we had a letter from an aircraft executive who has been seriously concerned about the encroachment of bureaucracy in our industrial system, especially in defense companies. Here is an extract from his letter:

"One of the aircraft companies recently had a military mock-up board on cockpit lighting on one of the new projects. It consisted of over 60 men and spent a week on a job that four or five qualified men could have done in three days. Every plant has a staff whose sole job is to try to keep these herds out of the hair of the men doing the work."

The improvements instituted by the new Pentagon regime have been legion, but one gathers that there are many fruitful fields still awaiting action.

### Bouquet to Frontier

For an illuminating, convincing story of what local service airlines can do for areas that are poorly served by ground transportation, or not served at all, Frontier Airlines of Denver, Colorado, deserves high praise for its attractive 16-page brochure entitled "A New Kind of Airline." This is the kind of factual, informative educational effort that pays off.

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*Lineator.*

The Chance-Vought Cutlass was an advanced design in 1947. It is a leader today. The same is true of Airborne's LINEATOR, which was developed for the Cutlass flight control system. Today, seven years later, there is not another "tee" type linear actuator like it.

The same basic model is used in the latest of the Cutlass series, and in the McDonnell Banshee. Modifications of the LINEATOR are specified equipment in the McDonnell Demon; its Air Force companion, F-101; and the Martin P5M patrol bomber.

Conforming to MIL-A-8064 (USAF), the LINEATOR is most adaptable where light weight and short length, for a given stroke, are desirable features. A ball bearing jack screw enables it to handle 1500 lb. maximum operating load in either tension or compression.

Airborne has set the pace in the actuator field with advanced designs like the LINEATOR. As aircraft configurations change and speeds increase, count on Airborne for more of the same. For information on the LINEATOR and other actuators, see our literature in the I.A.S. Catalog.



Accessories Corporation

HILLSIDE 5, NEW JERSEY

## Industry Spotlight

- Chance Vought's Regulus missile is using an electronic remote control system developed by Bell Aircraft Corp. which has made it possible to make as many as 15 flights with a single missile. Known as a proportional control, the Bell unit weighs less than 60 pounds and occupies less than one cubic foot of space. System is effective with aircraft or missile out of sight and flights of more than 100 miles have been controlled using radar for position data. Bell system now has more than 1200 flights to its credit.

- Philips Petroleum Company is operating an Air Force solid propellant rocket development and production facility at McGregor, Texas, for the Air Research Development Command. Plant is known as The Blue Bonnet Ordnance Plant.

- First use of a frozen lake for basing a squadron of jet fighters was in Sweden this winter—a wing of Saab-29 "flying barrel" fighters were temporarily based on a lake near Linköping for training purposes.

- Northrop Aircraft, Inc., has developed a missile mission simulator under USAF contract which permits checking missile electronic systems prior to installation in an airframe, thus cutting checkout time in half.

- Production stretchout on Boeing Airplane Company's KC-97 will extend production into mid-1956, 12 months beyond original date but with no change in total number of aircraft involved.

- Bell Aircraft Corp. has produced more than 1300 helicopters of the Model 47 series with total sales value of \$55 million. About 25% has been commercial. Estimates of helicopter production through 1953 (2400 craft) would make Bell the biggest helicopter producer, numerically. Sikorsky leads the field in airframe weight and dollar value of sales.

- USAF is still "analyzing" the cause of the two serious H-21 accidents which brought about the grounding of the Piasecki helicopters early in February. Helicopters are expected to be put into service again early next month. Neither the USAF nor manufacturer would comment on the nature of the accidents, the basic problem, nor the modifications now under way to correct it.

- Wright Air Development Center has developed a peak stress meter and associated equipment which instantaneously indicate propeller vibratory stress in pounds per square inch. Data can be plotted to show statistical distribution of stresses in a minimum of time.

- Military services and more than 30 electron tube manufacturers have agreed upon a single set of "Military Controlled Specifications for Electron Tubes." The system, which will permit earlier standardization, will also make possible statistical methods of lot sampling.

- New British blind-bombing radar gear is being tested on the Short SA 4 jet bomber which was designed to the same specifications as the Vickers Valiant but was not ordered into production. The six Avro Ashtons (jet Tudors) are also engaged in this program, which requires tests at altitudes above 45,000 feet.

- North American's bid to get into the jet trainer business in competition with Lockheed's T-33 got a serious set-back last week when the one and only prototype of the TF-86F crashed, wiping out the aircraft and killing test pilot Joe Lynch, Jr., North American's engineering test pilot who flew the F-100A on its first flight.

- Disclosure that Convair is building a prototype TF-102 will bring to a head discussions as to the requirement for a supersonic trainer. Fact that it is only supersonic in a dive was said to be major factor against North American's TF-86F in attempting to replace the sub-sonic T-33A and T-33B. Some companies claim sub-sonic versus supersonic factor is now meaningless since only a poorly designed modern aircraft would show any effects passing through the sonic barrier.

- One aircraft company, which has reached an advanced stage in design of a twin-engine plane for business aircraft users, now feels it may have its financing problem licked sometime this year.

- CAA's latest records show there are 760,761 certificated airmen, including 257,778 active pilots out of 634,158 pilots registered. Technicians of all classes totaled 126,603, with mechanics accounting for 77,391 of these, ground instructors 26,104, ATC tower operators 13,392, and flight engineers 3037. Roughly one third of the certificated private pilots (138,929 of the 376,286) are active.

- Air Research and Development Command has developed a de-icing sprayer which operates at temperatures as low as minus 65° F. for removing frost and ice from parked aircraft. Device uses chemical de-icing compounds and a highlift platform (up to 50 feet) to service all exterior surfaces.

- Battelle Memorial Institute has developed for ARDC refractory ceramic linings for use in cooling liquid fuel rocket motors of moderate performance level. System is substitute for regeneratively cooled motors and eliminates considerable amount of critical alloys as well as cutting fabrication costs.



BOEING B-52



*jet power packages by*

**ROHR**

This is the giant new Boeing B-52 — and this picture explains exactly what Rohr is famous for: Building power packages

— like the jet pods for this new Stratofortress — and other equally famous commercial and military planes.

In addition, Rohr aircraftsmen are currently producing more than 25,000 different parts for all types of airplanes.



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**ROHR**

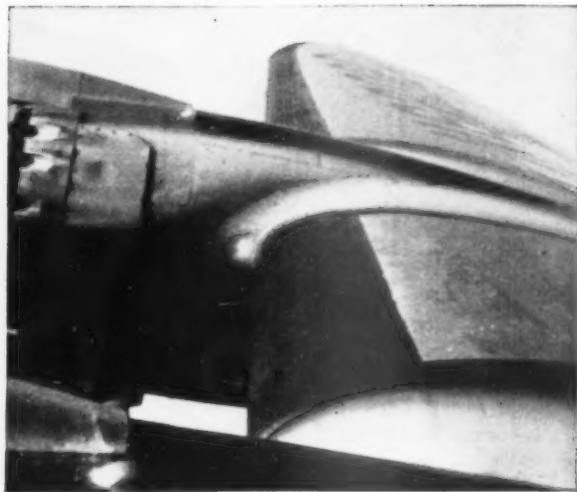
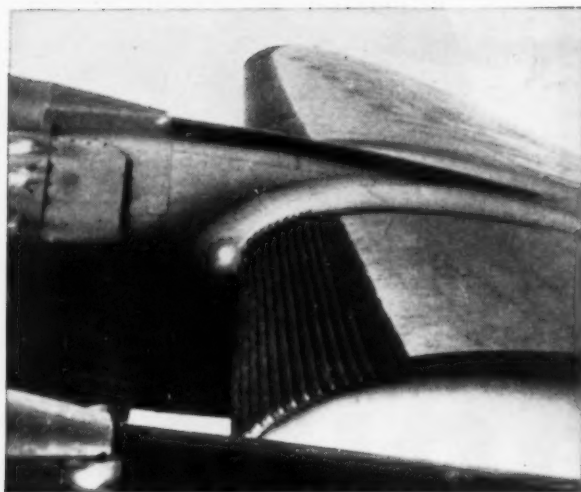
AIRCRAFT CORPORATION

CHULA VISTA AND RIVERSIDE CALIFORNIA

RESEARCH KEEPS

**B.F. Goodrich**

FIRST IN RUBBER



## Makes removing ice a snap

**T**HE WINGS of TWA's new Super Constellations, like the one in the top photo, are safely protected against ice with a new kind of B. F. Goodrich De-Icer. Dozens of small tubes running along the wings inflate (see bottom left photo) and deflate (see bottom right photo) to snap off ice so the airstream can carry it away.

The small tubes operate faster and with almost three times the air pressure than those used in ordinary wide-tube

De-Icers. This quicker action snaps ice off faster and cleaner.

Airlines report the new B. F. Goodrich De-Icer lasts longer, too. That's because they're made to fit and simply cemented onto the leading edges. No mechanical attachments, no stretching, no tension. The new BFG De-Icers are lighter and take up little space for plumbing.

The new De-Icer is used on all the new Super Constellations. It's one more development for the aviation industry

from B. F. Goodrich, leader in rubber research and engineering. Other B. F. Goodrich aviation products: tires, wheels and brakes; heated rubber; Pressure Sealing Zippers; Avtrim; fuel cells, inflatable seals, Rivnuts; hose and other accessories. *The B. F. Goodrich Company, Aeronautical Sales, Akron, Ohio.*

**B.F. Goodrich**  
FIRST IN RUBBER

AMERICAN AVIATION





MOVABLE STAND FOR POSITIONING the Convair XFY-1 is shown at left. At right, Lockheed's XFV-1 tries out conventional landing gear, which is being used for early test flights.

## Five Firms Active on VTO Fighter Projects

Navy reveals Lockheed and Convair designs; USAF programs to be disclosed at later date.

By HARRY S. BAER, JR.

USHERING in a significant era in aviation, the Navy's new vertical take-off fighters, the Lockheed XFV-1 and the Convair XFY-1, will soon bring on an extensive VTO production program to be fulfilled by the aircraft industry.

In on the ground floor for producing such "vertical risers," of course, will be Lockheed Aircraft Corp., Burbank, Calif., and Consolidated Vultee Aircraft Corp., San Diego, Calif. Although their VTO planes are "strictly X models," the Navy is quick to point out that they are "not entirely research planes."

One or perhaps both are likely to wind up as production models following a rigid flight test program set for this summer.

It appears that the Navy at this stage is not sold on turbojet VTO fighters, rather than turboprops, although it is working in this area. Use of an all-jet powerplant brings forth a new array of technical problems, particularly in accomplishing vertical landings.

Meanwhile, the Air Force is working in this field under contracts with Bell Aircraft Corp., Buffalo, and Ryan Aeronautical Co., San Diego. It has

also been indicated that Temco Aircraft Corp., Dallas, may be conducting a similar project.

The Navy's two-way approach to VTO flight enhances the program's chance of eventual success. Although both aircraft have identical powerplants, T40 turboprops produced by Allison Division of General Motors Corp., their airframe configurations are extremely different.

The XFY-1 employs a delta wing with which Convair has had a great deal of experience. The XFV-1 has a "conventional" straight wing, tapered at sizeable angles on both sides. Their tail assemblies, termed "cruciform tails" by the Navy because they form a cross, are also different.

Although the Lockheed plane has already flown, making conventional

take-offs and landings, neither aircraft has undergone its first VTO test. The Convair model is built only for vertical take offs, whereas the XFV-1 can be rigged with standard landing gear.

This means that Lockheed test pilots, H. R. (Fish) Salmon and Tony LeVier, will be able to practice at high altitudes the hovering required for landing before the actual ground vertical take-offs and landings.

Convair VTO test pilots, J. F. (Skeets) Coleman and Sam Shannon, will have to conduct their initial flights in the XFY-1 from the ground, straight up.

With similar powerplants, the VTO planes are expected to have essentially the same general performance characteristics. The actual performance results will not be pinpointed until after the flight tests. What the VTO aircraft will do, however, shapes up like this:

- A take-off speed of from 60 to 80 mph, with the capability of rising vertically to a height of 10,000 feet.

- A range of about 1000 miles with a full fuel load, although range is not a problem being considered at this early stage.

- A forward speed of more than 500 mph, similar to that of the Douglas A2D Skyshark, which is also powered by the Allison T40.

- An estimated gross weight of about 20,000 pounds.

Also interesting to note is the cost



Lockheed's  
Salmon



Convair's  
Coleman





LANDING GEAR for Lockheed XFV-1 in use will be four small wheels on the ends of the tail surfaces. Hydraulic shock absorbers will cushion impact.

of each plane, which has amounted to about \$10 million during the 2½ years since the contracts were awarded.

With VTO on its mind as far back as 1945, the Navy (no single individual) thought out the concept for the vertical risers. Navy officials had originally planned such aerial vehicles for target drones, but they soon determined such flight would be feasible for manned aircraft after Bureau of Aeronautics Research Division studies on paper in 1947 pegged the turboprop as the appropriate engine.

Early in 1950, the Navy presented its proposal to the aircraft industry, calling for participation in a design competition among major manufacturers. Only five responded. In the fall of 1950, contracts were awarded simultaneously to Convair and Lockheed. At the same time, Allison was awarded a contract for the 5500-hp T40's, which essentially consist of two Allison T38's tied into a single gear box to drive Curtiss contra-rotating propellers.

Primary consideration for the VTO powerplant was light weight with adequate power, since take-off weight is limited by take-off thrust. The T40's

power-to-weight ratio was more suitable than that of any other turboprop. An improved version of the T40 providing more horsepower will soon be available. The contra-rotating propellers were essential to eliminate the high torque effect of a single prop.

Following model tests at the National Advisory Committee for Aeronautics Langley and Ames Aeronautical



SKETCH shows how XFV-1 might be used to defend industrial area.

Laboratories, the two aircraft companies began construction of the VTO fighters. Normal delays, particularly problems encountered in employing turboprop powerplants, put the program approximately six months behind schedule.

VTO fighters, of course, require new piloting techniques, yet to be fully determined. Even though they are capable of climbing vertically to practically an out-of-sight altitude, actual take-off procedure will more likely have the aircraft nose over to a level attitude shortly after leaving the ground. In the process, vertical lift will be transferred from the propellers to the wings.

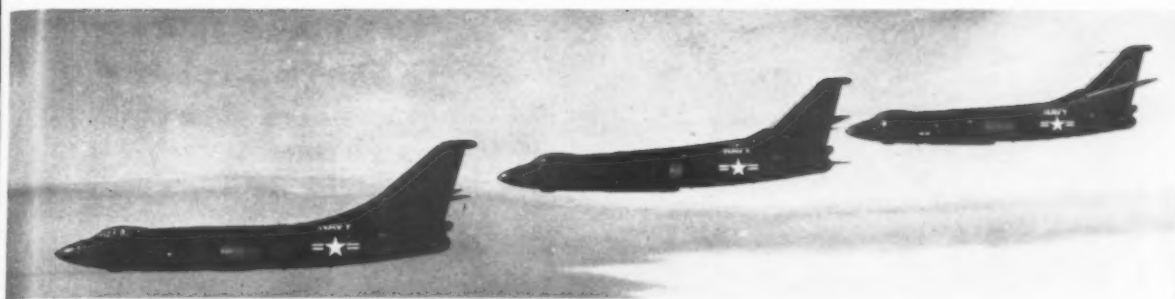
In landing, two methods may be used. The pilot can zoom the plane into a vertical attitude and in a sense "catch" the plane on the propellers for a rearward, straight-down landing. Or he may leave horizontal flight by gradually going into the stall region. In such procedure, he would have to move his plane past the vertical attitude to stop his forward velocity and position the aircraft for a vertical landing.

Since no one has tried such maneuvers as yet, the best procedures have yet to be determined. The Navy's chief interest will be the control aspects of each VTO fighter with the results being compared, one against the other. With high altitude practice hoverings for "take offs and landings" in the XFV-1, and with tethered tests on schedule for the XFV-1 at Ames Aeronautical Laboratory, the answers will soon be forthcoming.

Concerned about the safety of VTO pilots, the Navy has developed a parachute designed to float the pilot to safety from emergencies as low as 200 feet. Equipped with standard ejection seats, the planes require a parachute that will open at low altitudes and low speeds. The Navy has one which automatically opens following ejection, thereby cutting the "dead man region" of VTO flight considerably. A "rotatable" seat keeps the pilot upright in both vertical and horizontal flight.

Although the original concept of the VTO fighter was as a convoy interceptor, stationed on the fantail of a ship to relieve escort carriers for other duties, its potential work as a ground interceptor or for ground support work is obvious. In its present form, however, it is doubtful that it could compete with the bomber and transportation or rescue helicopter in their fields because of its weight limitations and control problems yet to be solved.

Cmdr. Russell L. Reiserer, the Navy's VTO project officer, states emphatically that the VTO planes will not affect the Navy's requirement for aircraft carriers.



The only three Douglas A3D's built thus far are shown in unusual formation photo over California. The twin-jet bomber is designed to perform at 600 mph and to operate at above 40,000 feet. Early models are seldom flown together, and operation in formation is particularly rare.

## 18 Missiles Listed by Defense Dept.

Eighteen current missiles and their designations have been listed in Defense Department Directive #200.5, which sets up a production scheduling system for "hard goods." The missiles include:

- **Surface-to-air**—Army Nike I (XSAM-A-7) and the Navy Talos (XSAM-N-6), Terrier I (XSAM-N-7), and Talos, W (XSAM-N-6).

- **Surface-to-surface**—Army Corporal (XSSM-A-17), Air Force Matador (B-61) and Snark (B-62), and Navy Regulus (XSSM-N-8, XSSM-N-8A).

## Thomas to Succeed Anderson on May 1

Charles S. Thomas, assistant defense secretary (supply and logistics), will succeed Navy Secretary Robert B. Anderson on May 1. Anderson is replacing Deputy Defense Secretary Roger M. Kyes, who announced recently that he would resign on May 1.

A World War I Navy pilot, Thomas served as Navy under secretary from February 6, 1953, to July 28, 1953. He held key positions in the Navy during World War II, during which time the procurement of aircraft was his primary concern. He is a former director of Lockheed Aircraft Corp.

## Air Power Not Sole Reliance: Radford

The United States "is not relying solely on air power" in this country's new approach to defense, Adm. Arthur W. Radford, Joint Chiefs of Staff chairman, told the Economic Club at New York recently.

"It is not correct to say we are relying exclusively on one weapon, or one service, or that we are anticipating one kind of war," Radford said. "I believe that this nation could be a prisoner of its own military posture if it had no capability other than one to deliver a massive atomic attack."

- **Air-to-surface**—Air Force Rascal (B-63) and Navy Dove (XASM-N-4), Petrel (XAUM-N-2), and Gorgon V (XASM-N-5).

- **Air-to-air**—Air Force Falcon (F-98) and Navy Sparrow I (XAAM-N-2), Sparrow II (XAAM-N-3), Sparrow III (XAAM-N-6), Oriole (XAAM-N-4), and Sidewinder (XAAM-N-7).

The directive also revealed the existence of a trainer version of the Convair F-102, and noted that Republic's F-105 has been ordered into production.



Sidney A. Stewart

## Stewart Leaves D-C&S, Joins Machine Tool Firm

Sidney A. Stewart has resigned as executive vice president of Delta-C&S Air Lines to join the machine tool manufacturing firm of Niles-Bement-Pond Co. as a vice president.

Stewart assumes his new post on June 1, when he becomes chief executive officer of the Chandler-Evans Division, West Hartford, Conn., with the title of manager. Stewart will continue,

however, as a Delta-C&S director and is being retained by the airline in a consulting capacity.

Stewart returns to the Hartford area after an absence of eight years. He was a vice president of United Aircraft Corp. prior to joining C&S.

## Boeing to Vote On Stock Split

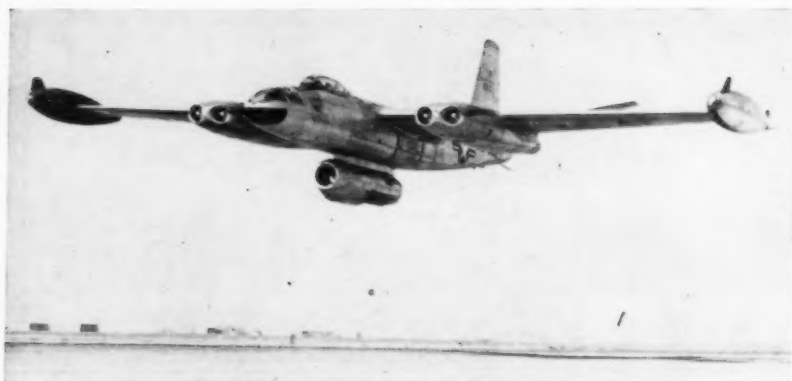
Boeing Airplane Co. stockholders are scheduled to vote on a board-of-directors-approved proposal to double the number of authorized common shares. If approved the authorized shares would increase from 2,500,000 to 5,000,000 and the 1,683,681 shares of common stock outstanding would be split up two for one.

## German Firm to Build Bendix GCA Units

Bendix GCA equipment (PAR-2 and ASR-3) is to be manufactured by Telefunken, leading German manufacturer of telecommunication equipment, under a technical assistance and patent agreement concluded between Bendix Aviation Corp. and the German company. Initially Telefunken will build two sets of Bendix GCA, and it is expected that these will be completed in the spring of 1955.

The license agreement currently limits the sale of Telefunken-built equipment to Germany, but it is expected that later GCA built in Germany will be available to countries which have difficulty in finding hard currency. The fact that Telefunken is able to start building GCA equipment is an indication of the liberalization of allied thinking regarding the "ban" on Germany manufacturing aviation equipment.

Telefunken is also buying two complete sets of Bendix GCA and installing them at Hamburg and Frankfurt airports this fall on behalf of the West German government. The price for the two ASR-3's and two PAR-2's plus spares will total about \$750,000.



**Retractable pod** holds an Allison J71 turbojet beneath the bomb bay of a North American B-45C during a flight at Allison's new test facility at Edwards Air Force Base. Engine is serviced by towing the plane over a pit.

## NACA Research Needs Expansion: Hunsaker

Disaster may result if the research program of the National Advisory Committee for Aeronautics is not brought into better balance with the national programs for military procurement and development, according to the chairman of the NACA, Dr. Jerome C. Hunsaker.

Hunsaker told a Congressional group that "blank areas" in our scientific knowledge need "timely and adequate research" if we are not to lose out in the struggle for air supremacy.

The hearings before the House Appropriations subcommittee also brought out that North American's F-100 has flown at 820 mph in level flight at 35,000 feet and that the NACA is spending about \$1 million per year on helicopter research.

## Sperry Engineers End Walkout

A 13-day strike of Sperry Gyroscope Co. engineers came to an end as members of the Engineers Association, an affiliate of the independent Engineers and Scientists of America, signed a two-year contract granting them a 6.3% wage increase. This was just what Sperry had offered before the walkout began. The engineers had demanded 15%.

Production was curtailed during the first few days as members of the IUE-CIO respected the picket lines, but the engineers authorized the crossing of their lines by production workers.

## CAA Completes Tests on Lightplane Autopilot

CAA has successfully flight-tested a lightplane autopilot developed by the Ansco Division of General Aniline and Film Corporation of Binghamton, N. Y. under terms of a \$14,888 procurement contract awarded in June 30, 1952.

Recently completed prototype tests were begun at CAA Technical Development and Evaluation Center in Indianapolis in September, 1953. CAA has returned the prototype to Ansco to be exchanged for a production model. Tests were conducted on a Piper Pacer between Indianapolis and Vandalia, Ohio.

Details of the unit were revealed in the June 22 issue of *AMERICAN AVIATION*, following 75 hours of flight testing by Ansco. At that time it was not known that CAA was behind the development. It was then learned that the projected price for the unit would be \$1295.

In addition to controlling roll and pitch, the Ansco autopilot provides automatic flight on any selected magnetic heading and homing on omnirange stations. The basic unit controls roll and pitch axes. When engaged it holds a heading within plus or minus three degrees and an essentially constant attitude, according to CAA tests. Second part of the equipment is a magnetic compass coupler, designed to maintain the aircraft on a preset magnetic heading for an indefinite period unattended.

According to D. M. Stuart, director of TDEC, short period departures from selected heads were noted, but the average heading was sufficiently accurate for the plane to reach its destination unaided. A plane equipped with the omnirange unit coupled to the omnirange receiver arrived within a few hundred feet of the station during tests.

## Murray for Airport Aid On 'National' Projects

"Some continued Federal participation in the financing of airport development is desirable at the present time," according to Under Secretary of Commerce Robert B. Murray. The long-awaited policy statement was made before a recent meeting of the Washington Chapter of the National Defense Transportation Association.

"We feel very strongly, however," Murray told the group, "that such participation is justified only if carefully concentrated upon airport locations, and types of construction, which represent the highest degree of essentiality from a broad national standpoint. We cannot justify the expenditure of Federal funds on projects which, though desirable, are predominantly of local rather than national importance."

### Outline of Changes

Murray outlined several changes to be made in reactivating the Federal aid to airport program:

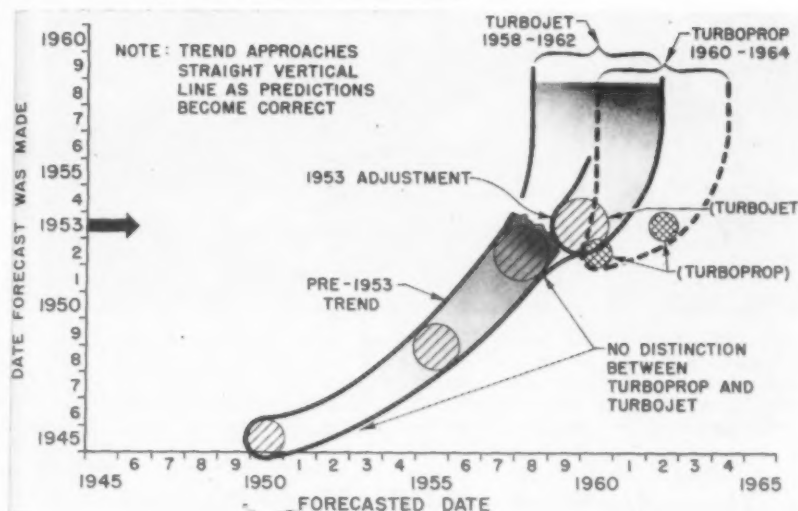
- **Tightening of basic standards** for determining eligibility of specific airports by using "criteria of national aeronautical importance."
- **Amendment of present legislation** to increase the discretionary fund that can be spent without fixed geographic apportionment.
- **Exclusion of airport terminal buildings** from Federal participation. This was originally recommended by the industry study committee.
- **Concentration of Federal participation** on runways, lighting, and related facilities.

Prior to this official statement, *AMERICAN AVIATION* learned that a bill for a reported \$33 million in Federal aid had gone over to the Budget Bureau. Final results are not yet known, but it is known that Commerce and CAA officials have already testified in its behalf. The plan is to get a final decision from Budget in time for the Senate appropriations hearings, probably early in April.

There had been previously unconfirmed reports that a clause calling for a 50% discretionary fund for the Administrator had been inserted into the supplemental appropriation bill. This is backed up by Murray's statement. Sources also state that a user charge clause for reimbursement of Federal funds expended on airports has been written in.



## The Transport Trend Line Shows . . .



## Time for an Improved Turbo-Compound

By WILLIAM D. PERREAULT

CURTISS-WRIGHT is moving ahead with plans to develop an improved version of the Wright R-3350 Turbo-Compound engine and thus give the piston engine a new lease on life in the speed range between 360 and 450 miles per hour.

In personal talks with top management at Lockheed, Douglas, and Convair, Curtiss-Wright president Roy Hurley has urged the transport manufacturers to get behind his company's efforts in piston engine development and thus extend the useful life of their airframe designs.

As for Wright Aeronautical, C-W's engine division, West Coast reports claim the company is prepared to spend \$5 million of its own money in development of the improved engine to increase take-off horsepower and, more importantly, sharply raise the cruising horsepower of the Turbo-Compound engine.

Crux of the Curtiss-Wright proposal is the redesign of the existing engine to boost take-off power from 3250 horsepower to 3800 horsepower (wet). Actually some of this power is now being used by the military services, which operate the engine at 3500 horsepower, but this has not yet proved acceptable for commercial operation. METO power would be upped to 3000 hp.

More important is the cruising power of the proposed engine. It would be raised from 1910 to 2300 horsepower for high blower cruise. Specifically this means that the Douglas DC-7, which now cruises at 365 miles per hour, could get about 405 miles per hour at 22,000 feet altitude. Thus the souped-up

Turbo-Compound would give Douglas a Super DC-7.

Interest of the manufacturers has been the "on-again, off-again" variety.

This is true because the engine would not give any one manufacturer a competitive lead. It would be used in existing airframes, thus an engine which would boost Constellation speeds by 50-75 miles per hour would also boost DC-7 speed proportionately.

Chief attraction for the airframe manufacturers is that it might extend the useful production span of existing airframes.

Basic interest must come from the airline operators, who have the most to gain from the souped-up engine. The case of the Douglas DC-7 has left no doubt in anyone's mind regarding the competitive advantage of 50 miles-per-hour added speed.

### "Flying Scotchmen"

Speaking in New York recently, Hurley introduced twin-engine and four-engine transport designs which he dubbed "The Flying Scotchmen." The only difference between the "Scotchmen" and existing transports was what C-W engineers have referred to as the "Turbo-Compound Plus" engine.

Hurley said future compound engine developments would push top piston-powered aircraft speeds to 425 mph. Other Wright statements have suggested speeds as high as 450 mph. This might be applicable with an airplane such as the Convair 340, which would be going from 2500 horsepower to 3800 horsepower if such an engine conversion were accepted.

Timing is the critical factor. Curtiss-Wright engineers have expressed the opinion in recent technical meetings (The American Society of Mechanical Engineers, December 1, 1953) that there is still time for another transport design to be introduced, be produced, and live a useful operational life before it would be outmoded by turbojet or turboprop-powered aircraft. These engineers, Russell R. Mock and Norton B. Jamieson, were speaking of jet transport timing (see chart) which included initial operations in the 1958-1962 period and turboprop transports in 1960-1964.

Hurley has informed the airframe manufacturers that the souped-up Turbo-Compound can be ready for flight test in mid-1956 and that initial production deliveries could be made in 1957. These estimates assume active interest on the part of the airframe manufacturers, since the C-W \$5 million investment is to be toward design and development, not toward production.

What Wright Aeronautical proposes to do to the R-3350 engine is theoretically simple. It would become an "after-cooled engine."

### After-Cooled

This phrase simply means that air entering the engine would be artificially cooled between its compression and combustion. This would require installation of highly efficient cooling units in the area between the supercharger housing and the cylinder, supposedly as an attachment between the intake pipe and cylinder head, but possibly in the nacelle.

This is not essentially a new idea, but postwar developments in cooling system designs now make it practical for the first time.

There are many avenues by which piston engine power can be upped. In past years this has included increasing the number of cylinders and using larger cylinders. This trend has leveled off and today's thoughts lean toward compounding with turbines of variable speed or increased efficiency, variable cam shapes to match valve operation with engine speed, etc.

Most of these methods are mechanically involved, require additional cockpit controls, or both.

Wright feels after-cooling is the most promising. First, cooling reduces the temperature of the combustion air and thus minimizes fuel detonation problems. Because cool air is more dense, it also provides greater air flow, increased combustion efficiency, and greater mass flow through the exhaust turbines which compound the compound engine. • • •



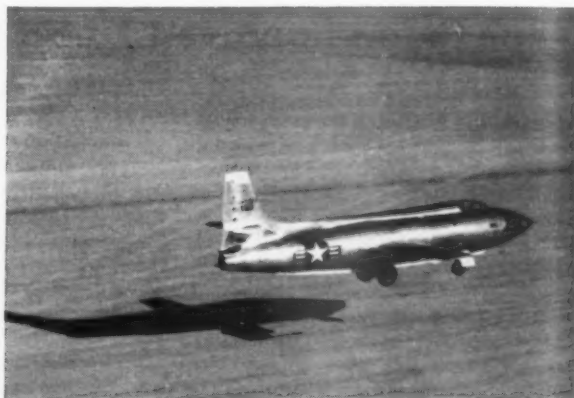


**First production model** of Republic's RF-84F photo reconnaissance plane shows air intake ducts in the wing roots. With cameras and radar in the nose and two .50 caliber machine guns in each wing, the RF-84F has a combat radius of over 5000 miles. Named "Thunderflash," the RF-84F is designed for use with the RB-36 in the operation known as FICON, in which it is carried by the mother plane until it is within range of its target. It is powered by the J65 Sapphire engine.

## Republic's New Thunderflash, Bell's New Record

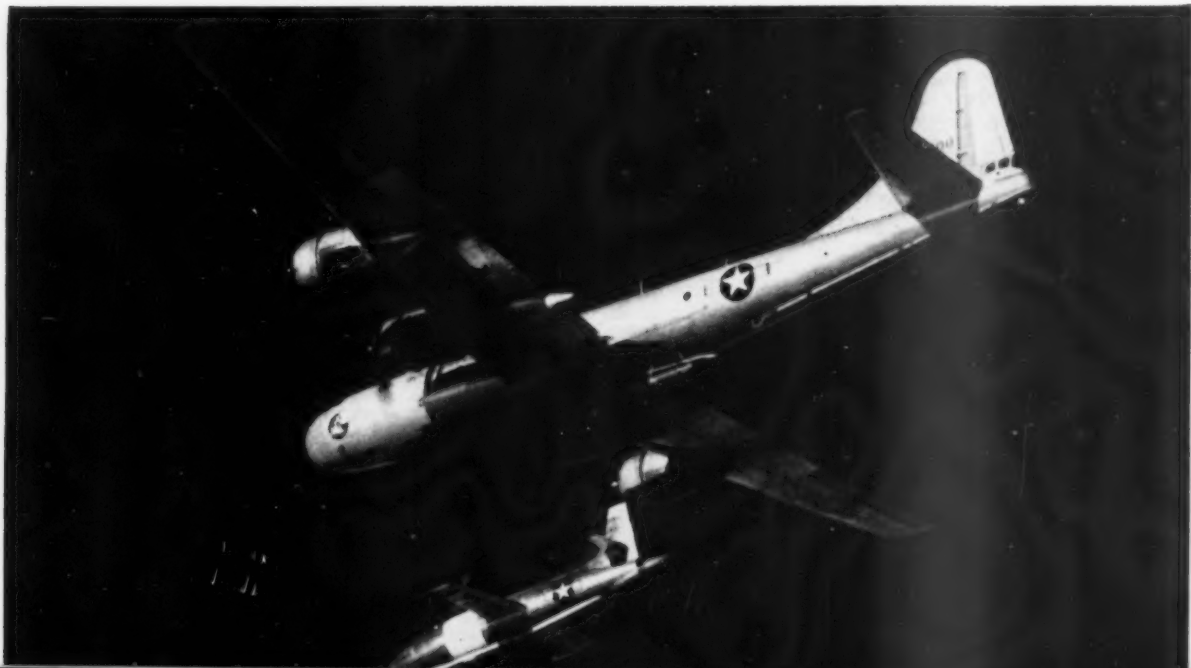


**Just before take-off** the rocket-powered Bell X-1A is towed over to be fueled as it is cradled in a Boeing B-29.



**Just before landing** after a flight of over 1600 miles per hour, the X-1A races its shadow along the runway.

**Dropping** from the B-29, the X-1A heads for a new world's record.



# New Policy Threatens Production Stoppages

Elimination of payments as work progresses may force some firms to refuse Defense contracts.

By ROBERT M. LOEBELSON

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THE AIRCRAFT INDUSTRY and the Pentagon have reached an impasse which could slow down production and delay attainment of 137 Air Force wings by the middle of 1957.

The situation has already resulted in at least one inevitable break in an Air Force production line and there are indications that if the problem is not remedied in the near future other production line stoppages will follow.

This time the delay is not caused by such perennial bottlenecks as shortages of machine tools and critical materials. Instead, it is the result of a new Pentagon policy—a policy which could be reversed as quickly as it was formulated.

The policy, dealing with progress payments for work done by aircraft and other defense contractors, was unexpectedly made known to the industry last October 30. Department of Defense Directive No. 7800.1, issued on that date, revised the order of preference for forms of contract financing.

It replaced a memorandum issued by former Defense Secretary Robert A. Lovett on October 14, 1950, which gave the following priority to financing of defense production:

- **Private financing** without government guarantee.
  - **Progress or partial payments.**
  - **Guaranteed loans** (with financing institutions participating to an extent appropriate to the risk involved).
  - **Advance payments.**
  - **Direct loans.**
- Last fall's directive not only eliminated the possibility of direct loans but set up a new policy, providing for:
- **Private financing.**
  - **Government guaranteed loans** with banks and similar organizations taking part.
  - **Progress payments** for work done.
  - **Advance payments.**

There were several reasons given by Defense Secretary Charles E. Wilson for the change, among them: "This is just in line with good business practice"; some aircraft contractors had "gotten sloppy with their government inventories" resulting in some overpayment in the past; and "financing must support procurement and should be designed to aid, not impede, essential procurement."

What the Defense Secretary either ignored or barely cited was:

- **Congressional refusal** to boost the legal U.S. debt ceiling beyond the present \$275 billion figure and the subsequent desire by the Treasury Department to keep all outgo down.
- **The fact** that certain banking interests might not be averse to collecting interest on money which they could provide if the Air Force stopped making progress payments.
- **The Services** could seek less new money to pay for work in progress, thus improving their chances of getting what they ask.

Directive 7800.1 dropped on the aircraft industry like the proverbial bombshell, even though it contained such qualifying clauses as "there may be valid exceptions in specific cases or classes of cases." In essence it boiled down to the fact that the industry's traditional method of doing business with the government was now out and that financing of work in progress would have to be taken out of the industry's limited profits.

## Interest Payments

The second alternative would entail additional borrowing from banks, involving the payment of interest charges which, under the Armed Services Procurement Regulations, are definitely not an allowable item of cost. Interest charges cannot be charged to the government contracts.

Acting through the Aircraft Industries Association, the industry on January 11 sent a lengthy letter to Assistant Defense Secretary (Comptroller) Wilfred J. McNeil urging that "the procurement procedures and the financial regulations which are established under this directive continue to provide for the ready availability of progress payments and advance payments to the aircraft manufacturing industry to the degree required by the circumstances involved."

The letter, signed by AIA president DeWitt C. Ramsey, supported this request by pointing out:

- **Progress payments** in contracting industries are a normal commercial practice.
- **No changes had taken place** in scheduled aircraft production program to warrant such a "drastic" change in financing arrangements.
- **Cost to the U.S.** would be increased because the annual interest pay-

ments based on the current volume of production would total "many millions of dollars." This would happen because the industry would require an upward revision of profit rates to maintain even its present profit margin. Moreover, the U.S. can borrow money at substantially lower rates than the aircraft manufacturers.

- **The industry** would be weakened and the military services would suffer. This would take place because plane builders would be unable to use profits for capital expansion and for research and development, because many capable contractors and subcontractors would be lost, and because the policy would tend to stifle concurrent military and commercial plane production.

- **When the Armed Forces** order a stretch-out in production, it would require additional financing by the industry. The contractor's funds would be tied up to an even greater extent because of the lag in ordering subcontractors to slow their own production. Moreover, industry firms now frequently deliver spare parts many months before a formal contract is signed.

The Ramsey letter apparently made some impression, especially since it arrived at about the same time that many small businessmen were making their unhappiness with the policy known to the Pentagon through their Congressmen.

On February 12, therefore, Secretary Wilson issued an interim memorandum for the guidance of the Service secretaries. Basic points:

- "It is not and has not been the policy of the Department of Defense that the proper use of progress payments should be stopped or unreasonably curtailed. Progress payments are sometimes necessary and useful to supplement the working funds available to defense contractors of all sizes."

- "... However, contract provision for progress payments should be only supplementary to private financing, including amounts reasonably necessary for contract performance."

- "... It should seldom be necessary for progress payments based on costs to exceed 90% of direct labor and material costs, or 75% of total costs, of the work done under the undelivered portion of the contract. Lesser percentages may often be adequate. However, higher percentages that may be found necessary in individual cases may be provided with the specific approval of the head of a procuring activity or of a general or flag officer designated for that purpose."

This memorandum ostensibly re-

laxed the restrictions imposed by Directive No. 7800.1. Nevertheless the industry has found the situation almost as bad as before, especially on the level where Air Force contracts are written, i.e., at Air Materiel Command Headquarters in Dayton.

Wilson and McNeil keep reassuring industry representatives that "no one is going to get hurt by the new policy" but their statements are not very convincing when the time comes for a contract renewal at Wright-Patterson.

One firm, for example, has consistently refused to accept a follow-on contract, claiming it simply does not have the money to finance the required work. Under the February Wilson memorandum, the company is permitted progress payments of up to 75% of total costs. But this so-called 25% of private financing would mean about 50% in all because of the delays in payments.

Previously, 90% progress payments under fixed price contracts theoretically meant 10% company financing. In actual practice, because of the same delays, the industry's own financing of work in progress has been running about 30%, but the latter figure is considered tolerable.

The company's refusal to accept the new USAF contract with its limiting clauses, reliable reports state, will result in the shutdown of one of the firm's USAF production lines, even if the difficulties are worked out at a later date.

The same situation is true of several other companies, but not necessarily to the same degree. Virtually every firm is making its reluctance to accept new orders, with their limitations on progress payments, known at AMC, but some are being forced to accept them.

Another company is understood to have held out and kept its aircraft production line going with \$500,000 of its own money, hoping that contract difficulties would be ironed out. But that company subsequently found itself in something of a financial box and had to accept the AMC follow-on contract to recoup its investment.

And two more have told AMC they will accept only cost-plus contracts as long as the present policy remains unchanged.

The situation is made ironic by the fact that the Pentagon and the industry have both been trying to cut down on the number of cost-plus-fixed-fee contracts in favor of fixed-price contracts subject to renegotiation. Yet the present policy may result in a shift back toward CPFF, principally because CPFF agreements provide for what amount to progress payments. CPFF's basic flaw, as far as the industry is concerned, is

the fact that it involves much more renegotiation.

Meanwhile, AIA is planning to continue its fight to get the Pentagon to be a little more realistic—to realize that the aircraft industry, because of its small profit margin, is not in a position to handle its own financing.

Industry leaders feel that Wilson and McNeil have failed to realize that progress and/or advance payments are the normal commercial way of doing business in contracting industries, which sell high-unit-cost, long-manufacturing-time items.

Progress payments, says AIA, are not in reality a financing method. They

are a necessary condition in aircraft purchasing.

The Pentagon should not seek special or unusual terms of sale which are not available to other buyers of airplanes, industry leaders hold. After all, they say, when a U.S. or foreign airline orders a commercial transport, or when a business firm orders an executive plane, payments are made to the manufacturer either as construction proceeds or in full when the order is placed.

Time is now becoming critical. If AMC contracting officers continue to fail to consider all the factors involved, contract refusals may multiply and production delays ensue.

## News Briefs

### MANUFACTURING

**Lockheed's new missile division** has signed its first union contract, a one-year agreement with the AFL-Machinists for the workers at Holloman Air Development Center, Alamogordo, N. M. . . . **General Electric's test facilities** at its Seattle service shop will be expanded by \$100,000 for the servicing of B-52 pneumatic equipment . . . **Explosive devices for ejecting bombs** from fast-moving aircraft are being perfected by McLean Development Laboratories, Inc., which is completing delivery of an order for McDonnell Aircraft. . . . **Japan's aircraft industry** is asking its government for \$8.3 million in subsidy to help pay for overhauling USAF aircraft.

### AIRLINES

**Allegheny Airlines** finished its fifth year of scheduled passenger, mail, and express service early this month with a perfect safety record and a total of 870,000 passengers and 125 million passenger-miles . . . **Operators of the C-46**, represented by the Aircraft Engineering Foundation, are not expected to ask for an extension of the March 31 deadline set by the CAB for that aircraft's compliance with transport category rules . . . **Continuing VFR flight** in IFR conditions has been cited by the CAB as the probable cause of the crash of a Regina Cargo Airlines DC-3 in Washington last September 1.



**Inauguration** of first class mail by air service between Washington and Miami brings together leading airline figures. From left to right, L. C. Parker, vice president of traffic and sales for Delta-C&S; Postmaster General Arthur Summerfield; E. V. Rickenbacker, chairman of the board for Eastern Air Lines; W. P. MacCracken, Jr., former assistant secretary of commerce for air under President Coolidge; G. T. Baker, president of National Air Lines; and I. D. MacVicar, chairman of Dade County Port Authority.



## Typical Army Helicopter Operation

"Exercise Snowstorm," conducted between February 15 and March 19 last year, used 11 Sikorsky H-19's and one Hiller H-23; missions, 78; hours flown, 354; miles, 14,000; passenger-miles, 10,894; cargo-miles, 1747; casualties, none; simulated casualties, 7; airlift cargo (lbs.), 174,000; aircraft availability, H-19 57%, H-13 13%.

**Conclusions:** More detailed planning is required. Adequately trained personnel and special tools are needed. Better liaison is needed between supported unit and helicopter unit. Cold weather factors must be considered more in planning. Loading and unloading should be done by supported unit.

## Army Will Buy 1000 Cargo 'Copters

**Program covers next five years; small lift capacity main complaint from past experience.**

AFTER more than two years of extensive helicopter operation, the Army feels there is much to be desired in making improvements in the development of future rotorcraft.

It states this explicitly in a recently announced evaluation of its experiences in operating and maintaining helicopters. The analysis was carried out by Maj. Gen. Paul E. Yount, Army chief of transportation.

With a sizeable procurement program under way, the Army is in the market for up to 1000 cargo-transport types during the next five years. Its aim is to equip 12 battalions, each with 67 rotorcraft.

This program has been designed to reflect the industry's capacity for production and development of cargo helicopters suitable for Army use. It has been stretched out and scaled down considerably from earlier Army expectations because the helicopter industry was not capable of meeting the Army's requirements in a short period of time, the report indicates.

In addition, the high cost due in part to the low production rate also emphasized the need for extending procurement over a longer span of years.

Although the Army has less than 100 cargo helicopters now in service, it has learned a great deal about large rotorcraft operation, possibly more than any other group. Its knowledge in this field was principally gained from use of the Sikorsky H-19 in actual operations and the Piasecki H-25 in training.

The Army sums up the major shortcomings of cargo helicopters as:

- Small lift capability of individual helicopters.
- High maintenance requirements.
- High degree of complexity.
- Relatively low service life of components.

• Variations in performance when operating under conditions other than ideal.

"In effect, the desirable machine should be simple, rugged, reliable, and easy-to-maintain piece of military equipment," the report states. "In view of the present state of the art, the ideal military transport helicopter is undoubtedly more than 10 years away."

This indicates that Army hopes for a heavy helicopter are not optimistic for this decade. Its only project in this area is the Piasecki H-16, now undergoing tests by the Air Force but as yet essentially untouched by the Army.

Army rotorcraft ambitions call for the eventual production of a helicopter with a more-than-five-ton cargo capacity. At this stage, it will have to depend on the medium Sikorsky twin-engine H-37, a three-ton aircraft just getting into production.

The Army's timetable for procuring cargo helicopters has not been met. From the time that the Army discovered that cargo helicopters could be integrated into its structure, it took two years until the first rotorcraft was received in quantity and an additional six months before the first equipped unit had engaged in an actual operation with cargo helicopters. A more rapid production rate had been anticipated.

The actual production slippage was one year in the case of one manufacturer and two years for another.

From its compiled operational data, the Army has determined that for logistic support its primary cargo type (the H-19) can be depended on to deliver an average of two tons of cargo

per hour of operation. The data also shows that the normal availability of all helicopters assigned to a unit has been approximately 57%. This means that only 12 out of 21 rotorcraft assigned to a unit are normally operational.

Original Army planning was based on an availability of about 66%, or 14 of the 21 assigned. The ultimate objective is a 75% ratio.

Average daily flying time per Army helicopter has been established at four hours during operational missions. An interesting note of comparison can be drawn from the first year's operation of New York Airways, which uses the same type of equipment. This commercial carrier's average flying time per calendar day was 3¼ hours, the Army reports.

The Army notes the following reasons why the use of helicopters has not been up to expectations:

- Helicopters were not always operated under ideal conditions.
- Capabilities of the individual aircraft as stated by the manufacturer were optimistic.
- Anticipated availability of aircraft were not as high as expected because of high maintenance and supply support requirements.

The supply support problem is slowly resolving itself, the Army notes, while modifications and engineering changes are being made in future helicopter designs in order that they may operate under field conditions which are not normally encountered in commercial type operations.

A significant point brought out in the helicopter summary concerns the convertiplane. The Army notes that one of its initial assumptions about the convertiplane—that it could be adapted to techniques for helicopter operations—has proved to be incorrect. A satisfactory, large capacity convertiplane is "still some five years away," according to the Army.

"Military leaders have indicated, that the convertiplane should be considered the ideal replacement for the assault transport," it states. "This means that development of this craft will not proceed along the lines of a short-haul transport. Hence, cargo helicopters, with limited forward speeds, must continue to be used for the short-haul moves in the combat area."

"It now seems clear that the helicopter is destined to play an increasingly important role in the tactics and logistics of the ground Army in the future," says General Yount. "While the helicopter of today still has a long way to go to become an ideal vehicle, its already tremendous margin of superiority over traditional Army vehicles is an ample promise of the future." • • •

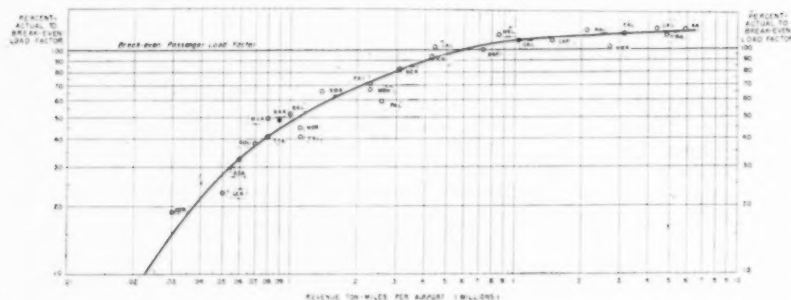


Yount



## Loads Determine Mail Rates . . .

CERTIFICATED DOMESTIC CARRIERS  
Year Ended June 30, 1953



## Revenues vs. Expenses Race Documented by CAB

By WILLIAM V. HENZEY

THE GRAPHIC STORY of the U. S. airline business will be unfolded henceforth in progressive quarterly installments made public by the Civil Aeronautics Board. On these pages are significant illustrations from the first such installment—that for the period ending September 30, 1953.

It confirms the general impression that aviation in this country is a rapidly expanding business with a thinning profit margin because the area of expansion finds expenses increasing more rapidly than revenues.

The story to be told publicly by CAB in the future is that which the Board has had before it privately through the years in the form of confidential staff studies. Perhaps the only significant difference is that the information will be "fresher" and not so old as to be non-representative of current industry trends.

Among studies now available is one which indicates into which service mail rate classification individual trunk and local service lines fit. For example, there are currently six trunk carriers now classified as Group I for mail rate purposes taking a 45¢ per ton-mile rate. In the upper left-hand corner of this page it may be noted that the six—American, Eastern, TWA, United Northwest, and National—transport over two million ton-miles of traffic per station.

That two million figure is the gateway to the Group I classification. Similar breaks are recognized by the Board down the line, with Capital, Delta, Western, and Braniff fitting into Group II (53¢ rate), and so on through the smaller trunks and the local lines.

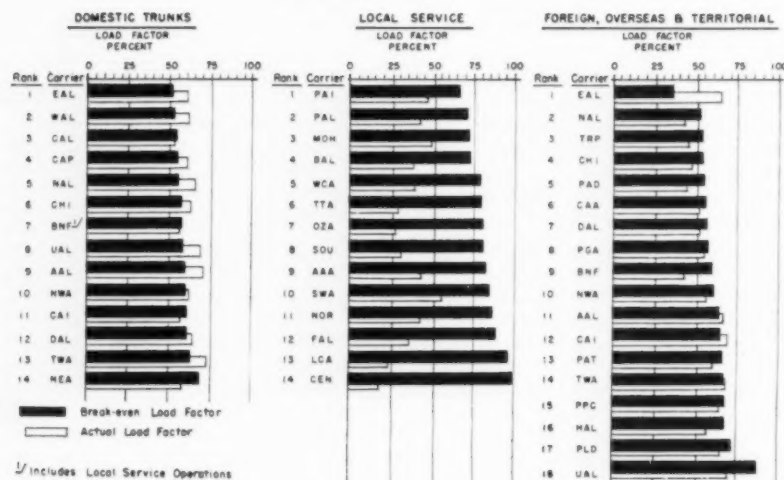
Since that test fixes the mail rate source of the airlines' revenue, and since the other sources, such as fares and property rates, are fixed by the carriers, subject to CAB tests of "reasonableness," the commercial rate structure thus is weighed against the amount of business carried and available.

The second chart on this page tells that story—how much of available capacity is being utilized and how much should be utilized in order to break even at the determined rate structure. In addition, it is illustrative to a certain extent of how much subsidy may be necessary to bring actual revenue up to match the break-even need.

From the composite picture thus developed, CAB then weighs how well

## Mail Rates and Load Factors Determine

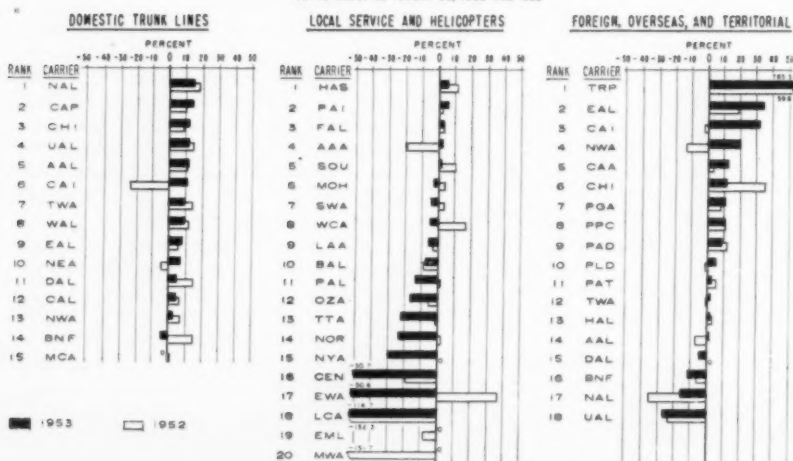
BREAK-EVEN VS. ACTUAL LOAD FACTORS  
Year Ended Sept. 30, 1953



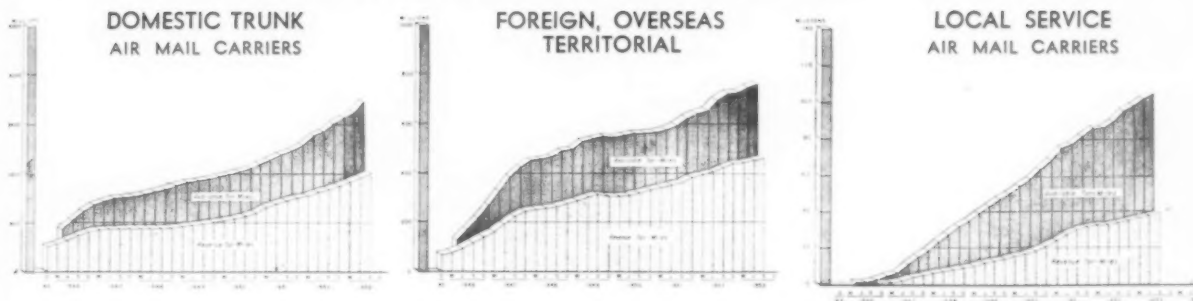
## ... Airlines' Return on Investment

NET OPERATING PROFIT, PER CENT ON INVESTMENT

CERTIFICATED AIR MAIL CARRIERS  
YEARS ENDED SEPTEMBER 30, 1953 AND 1952



## Excess Capacity is Climbing . . .



ANSWERS to such questions as how well the supply of air service is geared to demand may be found in the above charts. Significantly, in mid-1953 both supply and demand were at all-time highs for all classes of air traffic. If there is an over-supply, or a trend in that direction, it is thus readily apparent to CAB.

each carrier is doing on its capital investment. If the so-called "rate of return" is excessive, CAB studies the possibility of instituting rate or fare investigations. If the return is unusually low, fare increases may be in order, service cuts may be necessary, or Federal subsidy may be justified.

Those are the general rules applied to commercial aviation as a business. Within the framework of those rules, however, are numerous individual tests. For example, CAB recently stated (AMERICAN AVIATION, March 15) that the rate of return is not the only index of an airline's financial status and that an extended period of time, rather than one or two years, is necessary to weigh the average earnings of a carrier—before drastic rate action is taken.

Also, the "long-pull" test must be applied to service and traffic developments.

The domestic trunk carriers, for example, during a period when most carriers went off subsidy, more than tripled available service to the public over that available immediately following World War II. Traffic climbed sharply too, but, as indicated on this page, the most recent statistics show the gap is widening between services available and services used.

In the local service industry this is particularly apparent, but because the period embraced is that in which the industry was born and is being developed, the picture is more exaggerated.

The "widening-gap" trend is not so apparent in the international and overseas field, largely because of expanded low-fare services which attracted heavy traffic, particularly in the trans-Atlantic area. But that, of course, does not tell the whole story, because low-fare services necessarily entail lower average revenues but not necessarily lower average expenses.

It is thus that the race between revenues and expenses is the subject of individual CAB studies by classification of carriers. For the "Big Four" it is a merry race started in early 1951 when expenses joined revenues in an upward swing. Although the margin between them has remained relatively unchanged, the carriers fear the slightest economic change which will start revenues down in the face of constantly rising costs.

The remainder of the trunk industry is in virtually the same position as the "Big Four" although on a smaller scale. For that segment of the industry the gap between revenues and expenses is narrowed by inclusion of unprofit-

able operations of several subsidized carriers.

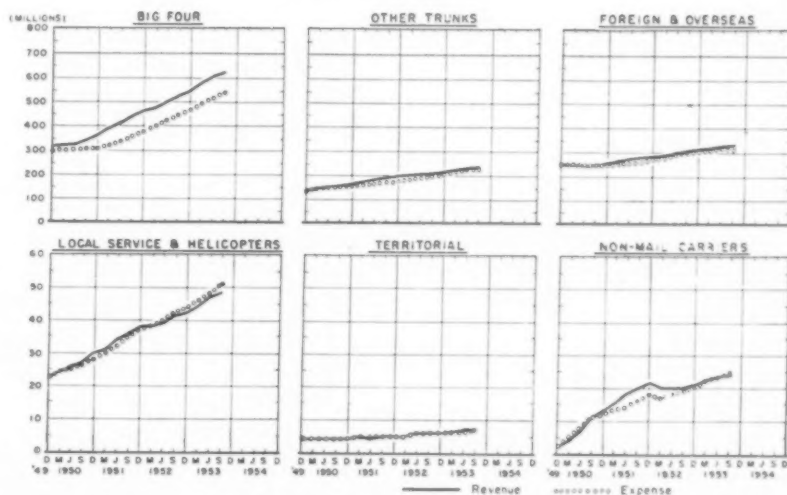
The healthiest development, according to this yardstick, is in the international field where, in mid-1953, expenses started downward although the increased revenue trend continued.

These reports, of course, are representative of the entire picture used by CAB in making its determinations. Responsible for their compilation is the now-independent officer of carrier accounts and statistics headed by Warner H. Hord. With a limited supply available, CAB nevertheless will make them available on a mailing list basis to early applicants. Complete set is designated as "Quarterly Report of Air Carrier Operating Factors."

## . . . And So Are Expenses

REVENUES VS. EXPENSES, CERTIFICATED CARRIERS

12-MONTH MOVING TOTALS



NARROW PROFIT MARGIN of the industry is emphasized by charts, with only the "Big Four" having an apparent gap between revenues and expenses.

*Presented below are excerpts from a speech given by Marshal of the Royal Air Force the Lord Tedder, G.C.B., one of the world's acknowledged authorities on air power, to the Air League of the British Empire in London.*

## The Shape of War to Come

**D**ESPITE all the hopes which buoyed people up during the trials and horrors of the late war, the world has been forced, regretfully and bitterly, to the conclusion that the law of the jungle still runs, that security without strength is a mirage, that, in fact, weakness invites and indeed provokes aggression . . .

What form should the military strength of the free world take? . . .

All the NATO nations (and particularly Britain) depend on seaborne supplies and are therefore vulnerable to attack at sea; all, and again especially Britain, are vulnerable to attack from the air; all the Continental nations are open to attack by land over the relatively short distances from Russian occupied territory.

What does this mean? Does it mean that we must in peacetime build up and maintain massive armies with all their supporting air forces on the Continent of Europe on the scale which it took four years of the combined British and American nations to attain? Does it mean that we must also during peace build up against the vast numbers of ships, vessels and aircraft we had in 1944 to secure our sea communications? Does it mean that every nation must build up air defenses—the great network of communications, anti-aircraft and fighter defenses—which proved to be necessary in the last war?

I suggest that to attempt to build up military strength on these lines would be, not to provide a deterrent to aggression, but to bankrupt the free world and hand it over to communism and chaos without a blow. Yet military power we must have, defenses we must have.

Let us look at the other side of the picture. Russia's sea-borne supplies are negligible and against her our traditional weapon of naval pressure is virtually innocuous. The history of Napoleon and Hitler should be sufficient proof of the folly of attempting land invasion of those vast areas. Only from the air is Russia open to attack.

There is the problem.

I have no simple solution but I do think we tend to make the problem unnecessarily difficult by failing to consider it as a unity. There is still a tendency to regard the war at sea, on land, and in the air separately, defenses of sea communications being a matter for naval ships and ship-borne aircraft, the land campaign a matter of divisions (with of course supporting tactical aircraft) and air defense a matter of anti-aircraft radar and fighters. For some reason which defeats me many people forget or ignore the other force which in the last war proved to be the one common factor and did in fact unify the operations in the three elements—the bomber force . . .

I emphasize . . . the bomber, the offensive component of defense, because I feel it is absolutely essential to remember that purely passive defense with no offensive element is in practice no defense at all . . .

I also emphasize the bomber for two other reasons. Firstly I feel that it is only by making proper provision

for utilizing the immense potentialities of the bomber that the requirements for pure defense, for the war at sea, on the land, and for close air defense, can be kept within any reasonable financial bounds. Secondly, it is the bomber and the bomber alone that can, under present conditions, provide the essential offensive element of our defenses and act as a real deterrent . . .

And that brings me to what I feel the crux of the whole problem—the atomic weapon. . . . I believe there are very few people in this country who have more than the vaguest idea as to the fearful potentialities of the atomic weapons now within sight. It is no Jules Verne story to say that war with these weapons might literally destroy European civilization . . .

I have seen reports that the American authorities are seriously considering putting the bulk of their defense efforts into passive air defense against atomic attack. With all respect to the experts who may have given that advice, I myself believe such policy would be a fatal mistake . . .

I also believe that to adopt such a policy would greatly increase the risk of war and of atomic attack—since the deterrent afforded by the atomic bomber force would have been sacrificed . . .

### No Duel, But Suicide

This may seem a pretty gloomy picture, the world divided into two armed camps with the contestants holding a pistol at each other's heart. But I believe there are real grounds for hope. A contest using the atomic weapon would be no duel but rather mutual suicide—that is scarcely a prospect to encourage aggression . . .

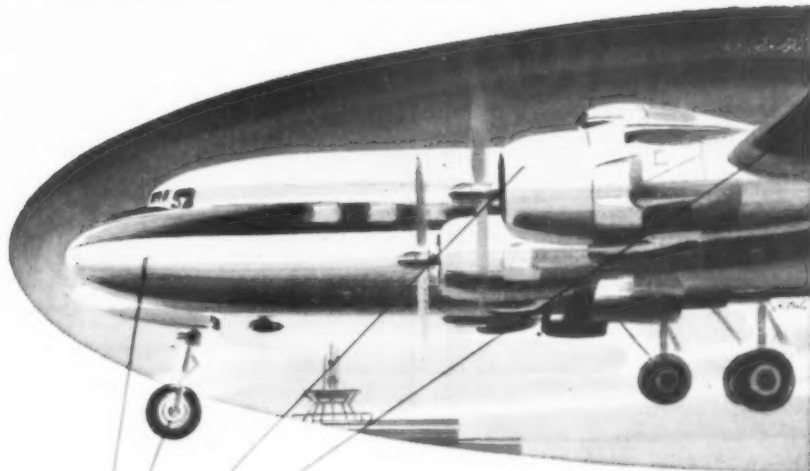
There was a time when it might have been doubtful whether democracies with their natural abhorrence of war and tendency to live in the present, would have the solid judgment and the sense of responsibility to accept such an issue and its implications in peacetime.

As it is I think that one of the most remarkable developments in this uneasy postwar world has been just that—the growth of a real sense of mutual responsibility among the free nations, and nowhere more remarkable than in the case of the United States, despite their natural absorption in their own problems and their traditional distrust of external commitments.

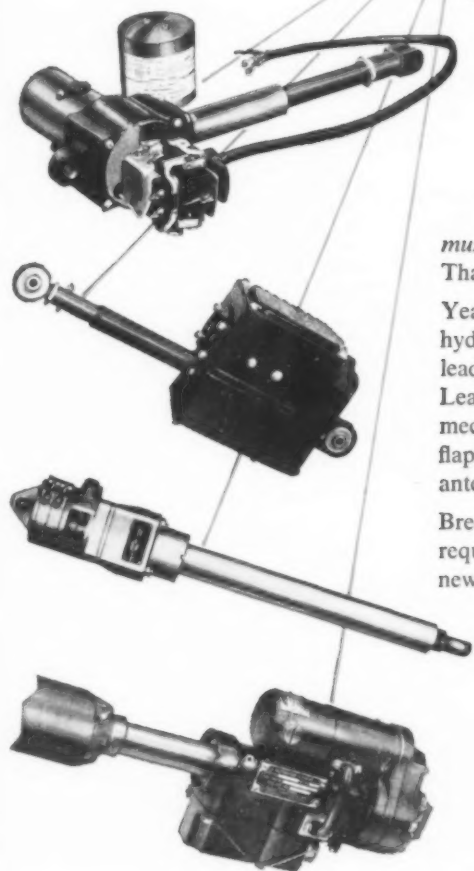
At the same time I must make it clear that I would not for one moment accept the thesis which has been put forward occasionally—that because atomic development is expensive, because atomic bombers are allegedly expensive, because the United States already has an atomic bomber force, Great Britain should leave this element of military power to the United States.

I believe that now and in the difficult years ahead our British experience and judgment in world affairs is and will be of vital importance to the world at large . . .

I agree with Cromwell on this issue, let us trust in God and keep our powder dry.



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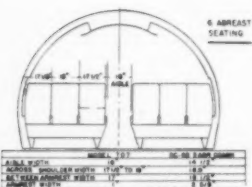
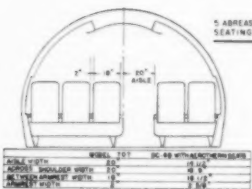
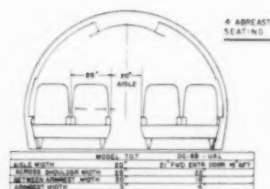
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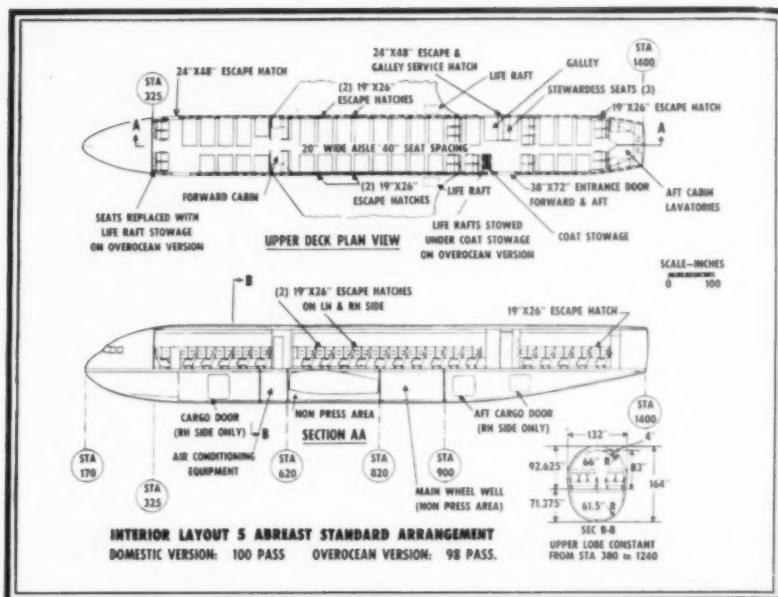




FUEL LOCATION



LARGE cross-sectional area of Boeing 707, 132", provides operators with ample room to use high-density interior with up to six seats abreast or plush interior with four widely spaced seats. Note comparisons with other aircraft.



TYPICAL ARRANGEMENT of the Boeing 707 cabin for 100 passengers.

## More Details on Boeing's Jet Transport

Prototype and production aircraft will vary considerably, especially in gross weight and fuel.

AS the roll-out of the prototype Boeing 707, now scheduled for early June, draws near, more information on the four-jet tanker/transport aircraft is becoming available. This month's release by Boeing Airplane Company, (AMERICAN AVIATION, March 15) of model photos, along with details of financing arrangements with the Treasury Department, filled in some important gaps.

The accompanying Boeing drawings of the interior arrangements of the new aircraft in its futuristic airline role plus performance curves on the domestic and overseas versions of the aircraft round out the aircraft's potential as reported in AMERICAN AVIATION for November 23, 1953.

The most apparent conclusion to be drawn from the official Boeing release when compared with this data being supplied to the world's airlines is the fact that the prototype and commercial production aircraft would be quite different in specific details.

Airline representatives visiting Boeing's Renton, Wash., plant have been told the prototype aircraft will gross 160,000 pounds and that early flight tests will be made at 110,000 pounds. Official releases cite the gross weight as 190,000 pounds, as do the airline brochures.

On-the-scene reports also quote fuel capacity of the prototype as 8776 gallons in four fuel tanks, while commercial aircraft data released show it to be 13,680 gallons in eight integral wing tanks, which can be supplemented with 4200 gallons in centersection tanks.

Other drawings show 500-gallon wing tip tanks used to supplement the wing tank capacities.

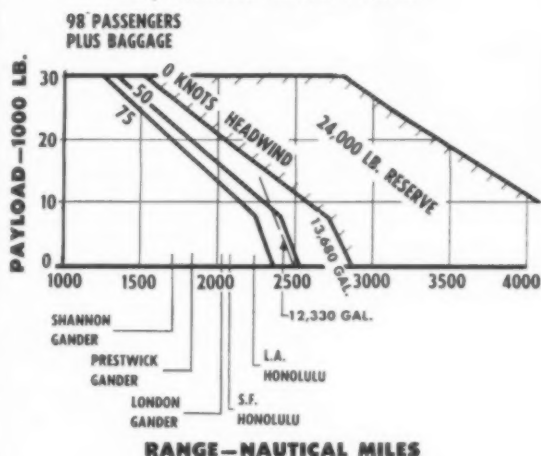
### Air Force Interest

A significant trend is the U.S. Air Force's growing interest and investment in the Boeing tanker. Industry sources indicate that the USAF is working with Boeing in using the prototype as a test vehicle for advanced accessories, such as the pressurization equipment of AiResearch and of the Stratos Division of Fairchild Engine and Airplane Company reportedly going in the initial plane.

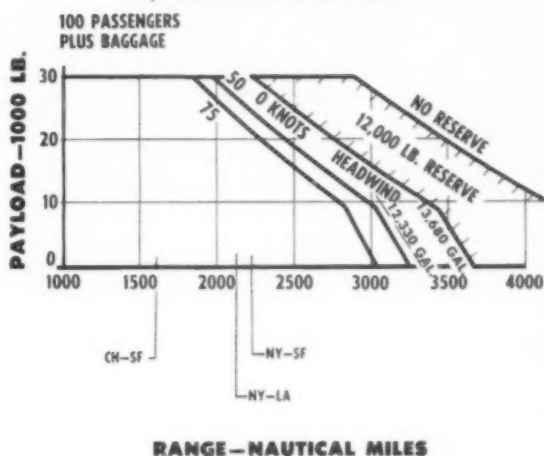
Despite growing interest of the USAF in the Boeing tanker design, earlier reports that the plane when rolled out of the hangar will carry USAF markings now appear to have been premature.

Commercially this is the outlook for the Boeing 707: Boeing's payload/range curves (see next page) show it

# 80% NORMAL RATED POWER



# 80% NORMAL RATED POWER



OVERWATER configuration of Boeing's 707, shown in curve above, operates well below its maximum payload of 30,000 pounds on the long North Atlantic runs.

DOMESTIC configuration of Boeing's jet transport proves to be well suited for the long trans-continental flights, even against headwinds with high fuel reserve.

to be a favorable one-stop or even non-stop transcontinental aircraft. This presumes 12,000 pound fuel reserve, providing 260 nautical miles flight. Under these conditions the 707 will carry a full 30,000 pounds payload 1750 miles against 75 knots headwinds. This extends to full payload for 2000 miles at 50 knots headwind, and 2200 miles with zero headwind.

On the North Atlantic route, the real test for jet transports, the B-707 has a more difficult role. In this case fuel reserve is 24,000 pounds, cutting sharply into payload and preventing the New York-London flight non-stop as a practical venture. The plane can, and undoubtedly will, fly this route non-stop, but not on a commercial basis,

according to Boeing's operating curves.

More specifically, 5000 pounds of the 30,000-pound payload of the B-707 is lost in the 98-passenger overocean version on the 1800-mile Prestwick-London flight with zero headwind. A 50-knot headwind on this route cuts payload to 20,000 pounds. Payload has dropped off to the zero line well before the plane reaches the 3000 mile London-New York run.

The Boeing 707 has a design dive speed of 400 knots, or Mach .95, a design cruise speed of 320 knots or Mach .85. Limit gust load factor is 2.33.

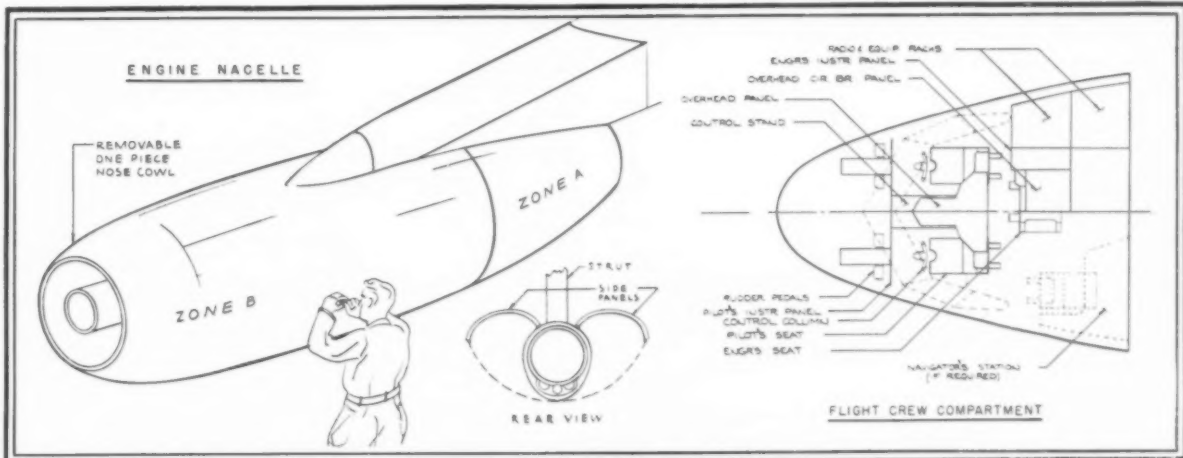
The following weight breakdown of the domestic version of the aircraft shows the relationship of empty weights, useful loads, and gross weight:

## BOEING 707

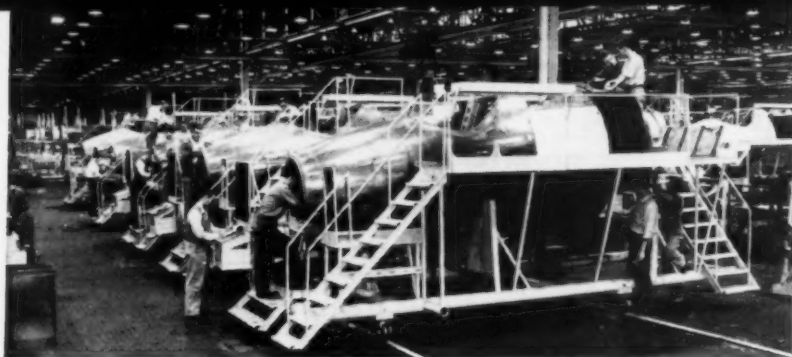
Empty wt. ....	88,890 lbs.
Operating wt. ....	92,120 lbs.
100 passengers ....	16,000 lbs.
Baggage ....	4,000 lbs.
Cargo ....	5,000 lbs.
Total payload ....	25,000 lbs.
Fuel (11,212 gals.) ....	72,880 lbs.
Gross wt. ....	190,000 lbs.
Design landing wt. ....	145,000 lbs.
Design wt. (min. fuel) ..	125,000 lbs.

Other technical data include:

Wing area ....	2400 sq. ft.
Aspect ratio ....	7.0
Taper ratio ....	.34
Sweep (.25 chord) ..	35°
Dihedral ....	7°
Cargo volume ....	1063 cu. ft.



JET POD arrangement on the 707 shows engine cowl to be designed for easy engine access. Cockpit arrangement, shown at right, provides for three-man crew, including a flight engineer.



MARTIN'S B-57 PRODUCTION LINE is a moving line, each operator having a station where he performs one task. The British have a static fixture with operators bringing parts to this point for gradual build-up.

## Building the B-57: Two Approaches

Manufacturing techniques in two countries emphasize reliance on skill or on tools.

THE CONSTRUCTION of the English Electric Canberra in the U.S. by The Glenn L. Martin Co. has pointed up a number of basic differences in production methods in Britain and the United States. Examples of these differences were given recently by Glen A. Evans, tooling manager of Martin, in a talk before the Washington, D. C., section of the Society of Automotive Engineers.

A very basic difference between the British and U.S. industries is that the former employs a group of artisans who do a great amount of handwork and fitting in all phases of manufacture and assembly (handworking of structures late in assembly stages is common), whereas in the U.S. comparable skill would be used on an experimental aircraft.

"We could never afford such luxury in a production assembly department," Evans said. In the U.S. methods

and tooling must be such that unskilled labor can be used. Even though the U.S. uses unskilled labor and Britain uses skilled workers, the cost of labor in Britain is one-third of that in the U.S.

In tools there are certain basic differences. American tools are designed to be self-contained and a great amount of consideration is given to the operator, whereas the British choose to attach their fixture members directly to the floor. Evans comments that "they are quite cumbersome and inaccessible to the work."

An example of the difference in planning is that of the assembly of the aircraft. The British perform all operations in a fixed position, while the Martin B-57 is built in movable fixtures where the work is cycled and moves past the operator, giving each worker the minimum amount to learn.

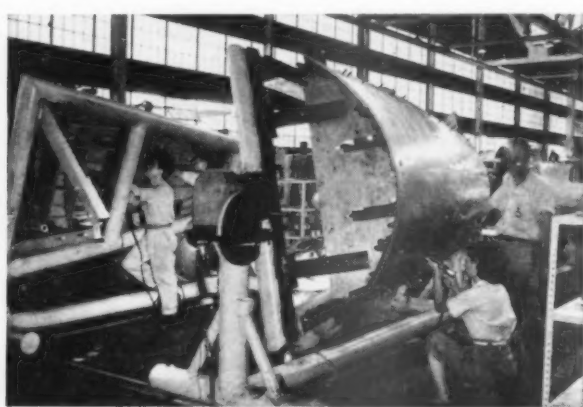
Evans claims that the greatest difference in methods of production is the attention given to planning in the U.S. and the apparent lack of it by the British: "The U.S. theory is that it is cheaper to think mistakes than to find them out by physical execution; everything must be scheduled on the basis that good ideas, if obsolete, are no longer good."

On specifics, Evans pointed out that the USAF required that the American version of the Canberra, the B-57, remain the same as the English Electric version but called for several major changes to make it a suitable tactical weapon for USAF needs. These include:

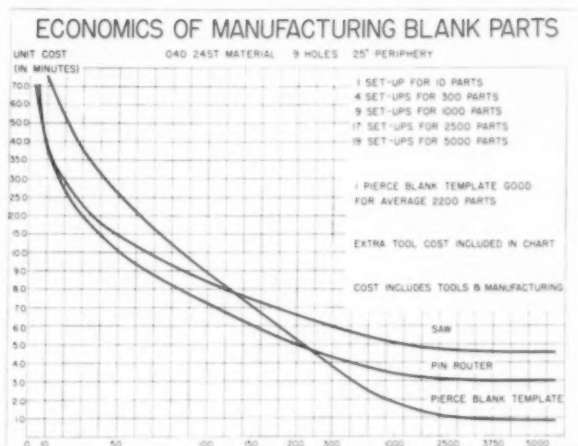
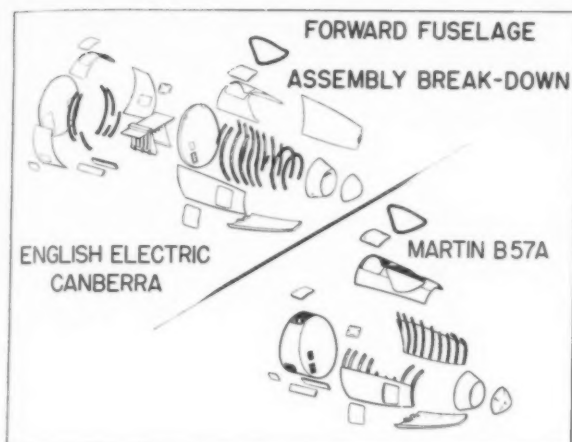
- Changing from a three-man to a two-man crew configuration.
- Changing the bomb door from a clamshell to a Martin rotary type.
- Adding additional internal wing tanks and fixed gun installations.

All these changes have been made within the target weight requirements and at the same time the original aircraft's performance has been improved. There were many changes in production breakdown and detail design which Martin engineers wished to make (for example, they wanted to break down all structures into components to take advantage of automatic riveting equipment), but the time element prohibited consideration of many of them.

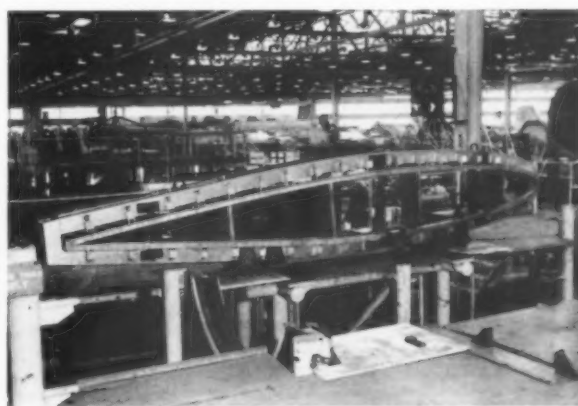
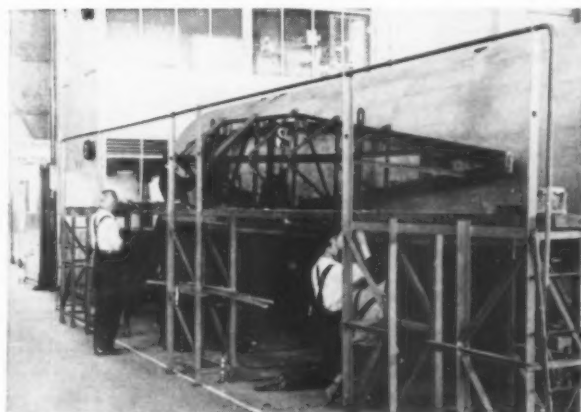
For material and standard parts such as pipe couplings, ball bearings, hinges, screws, rivets, etc., a conversion manual was compiled. The British use 90° and 120° countersunk rivets while the countersinking and riveting equipment at Martin was designed for 100° countersinking. A countersunk rivet with a convex head was designed that permitted the use of existing automatic equipment and resulted in many man-hours saved. • • •



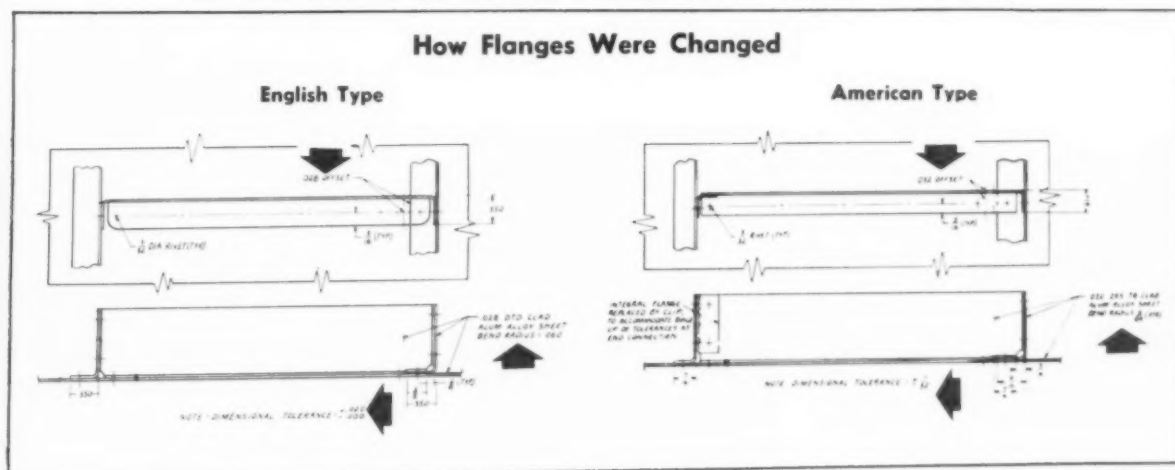
COMPARED above are the American and British methods for tooling the B-57/Canberra. The British tool (left) is fixed to the floor and the work is solidly attached to the tool; to operate at the top edge of the part, the operator stands on the boxes seen in the foreground. The American tool (right) is mobile and can be rotated for easy access to any part of the work.



SCHEMATIC COMPARISON (left) shows the forward fuselage assembly breakdown in the Canberra and the B-57; change from a three-man to a two-man crew configuration affected the structure to the extent that a new breakdown could be established. The type of charts used by Martin to determine the type of fabrication which is most economical from the standpoint of quality is illustrated on the right. These facilitate determination of which method is best for given quantities of pieces.



BRITISH PROVIDE A DRILL FIXTURE for the wing attaching holes in the center fuselage (left) and then use these fuselage holes as a guide for drilling the mating wing members. This does not provide an interchangeable wing for spare requirements and is costly in man-hours because of inaccessibility. The American method is to match drill both wing and center fuselage sections so that assembly operation merely consists of installation of bolts. Illustrated on the right is the tool used by Martin to locate wing attaching points in the fuselage.



INSTEAD of having to hand-tailor details in assembly to  $\pm .020$ ,  $\pm .005$ , the tolerances were increased by Martin to  $\pm 1/32"$ . Quality was not affected since mold lines were still maintained in final assembly. Thus the same end results were achieved without the cost of working to tolerances that had no functional justification.





**GETTING UP TO LEAVE YOUR SEAT** takes on a new significance when bailing out of a jet, as this Republic Aviation photo illustrates. The device being tested above automatically unhooks the pilot's safety belt when he reaches the top of the arc, some 35 feet above the cockpit; he then falls free of the seat.

## A Look at ARDC's Recent Projects

Group's head, Lt. Gen. Putt, discloses latest advances in electronics, metallurgy, other fields.

**D**URING 1953 the Air Research Development Command contracted with 1520 industrial companies and 160 universities, colleges, and other non-profit organizations to carry on 86% (dollarwise) of the U. S. Air Force's research work, according to Lt. Gen. Donald L. Putt, commander of ARDC.



Putt

Speaking at be-

fore the 50th Anniversary Dinner of the Engineers Society of Pennsylvania recently, Putt gave the industry its most complete accounting to date of the specific areas in which ARDC funds are being used to put this country in the lead in any future war, the war which Putt referred to as the "sliderule war."

Ranging from transistor flip-flop circuits to cargo tie-down equipment and from rocket engines to shatter-resistant cockpit canopies for jet fighters, Putt made many new disclosures of basic developments:

- Increased capability provided for GCA precision approach radar units by design of a large turntable on which a single radar unit can be used to cover landings in either direction on one runway (in the event of a wind shift) or, presumably, two converging runways.

- Discovery that "riveted sheets of metal could be separated by noise intensities" during the course of investigations into the effects of high intensity jet and rocket engine noise on personnel and aircraft. Project was conducted by Soundrive Engine Company and results turned over to the Armed Forces' National Research Council Committee on Hearing and Bio-Acoustics.

- A Lockheed F-94 with a titanium aft-fuselage section logged more than 75 flight hours during the year, and titanium components for Convair B-36 jet engine pods were developed by Convair, working with Wright Air Development Center.

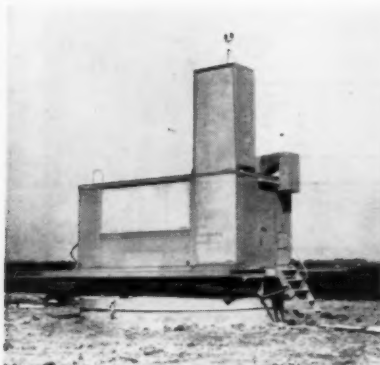
- Automatic flight moved a step closer with development of an "automatic sequence selector" by WADC and Minneapolis-Honeywell Regulator Co. Selector uses tape-recorded, pre-selected flight plans—which are fed into the aircraft autopilot—and airspeed control. Unit works on punched-tape principle, taking over many duties of the pilot by "memorizing" flight plans and converting them into aircraft operation through the autopilot.

A condensed summary of the Putt disclosures, contained in his talk titled "The Challenge of the Air Age," follows:

**Electronics:** Ford Instrument Company developed the A-1 dead-reckoning computer which continuously calculates and indicates aircraft position in terms of latitude and longitude. Pilot feeds in aircraft's initial latitude and longitude, wind velocity, heading, and magnetic variation. Aircraft speed and heading are automatically fed to the computer, which provides the composite position data to the pilot.

Rome Air Development Center developed and test flew a data link system which "employs the communications received for transmitting guidance and navigation instructions without interfering with normal voice communications. The system requires only an adapter to existing communications receivers to present the guidance and navigation information on cockpit instruments or transmit it directly to the airplane's autopilot."

Sylvania Electric Products and Raytheon Manufacturing Co., working with WADC, made progress toward development of a complete line of small electron tubes capable of operating at



**TURNTABLE RADAR** will permit GCA unit to be used for various wind conditions without moving it from place to place. At right, engineers examine the punched tape that controls a complete flight in new Minneapolis-Honeywell flying aid.



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high temperatures in hermetically sealed, expendable assemblies and sub-assemblies.

**National Union Radio Corp.** and WADC developed dual triodes with separate cathodes and subminiature voltage amplifier tubes with small heater power to reduce filament power to a point where bulky blowers or heat exchangers could be eliminated. New tubes have heater power of 1/2 watt, compared with two watts for present subminiature tubes.

**Transistor test and evaluation aids** were developed by WADC, including a noise tester, impedance tester, four-pole parameter tester, current gain versus frequency, rise, fall, and delay time indicator, and oscilloscope display of static characteristics of transistors.

**Simulators:** Rheem Manufacturing Co. and WADC developed the F-151, a fixed-gunnery trainer used to duplicate actual conditions of a gunnery mission from take-off to target interception and return. Trainer incorporates a target image projection device, a conventional flight simulator, fire control system, screen, and instructors controls. The F-151 permits flying missions by radar, visually, or by a combination of both.

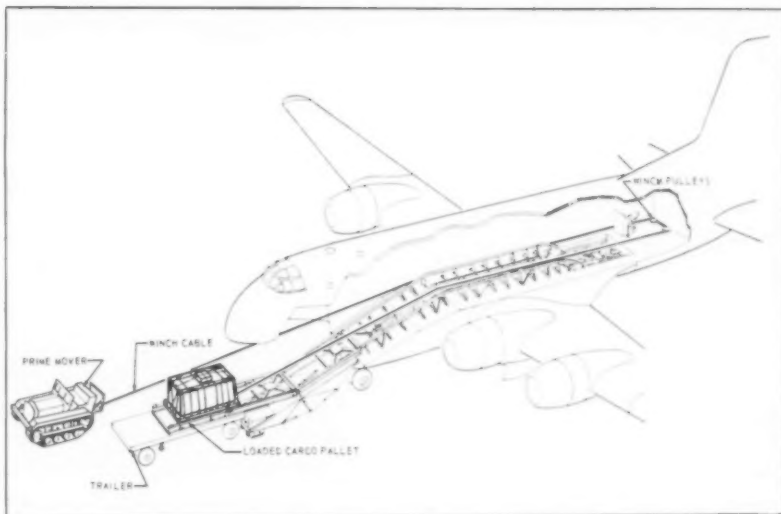
**Link Aviation Company** produced the first F-89D flight simulator incorporating radar fire control simulation.

**Air Cargo:** Douglas Aircraft Company and WADC devised a method of parachuting heavy equipment from the Douglas C-124 using a pre-loaded pallet system which makes it possible to drop 40,000 pounds within a few seconds.

**New method for tying down cargo** in aircraft for delivery was developed which permits automatic release of the tie-downs when the extraction parachute inflates, thus eliminating the need for personnel to enter hazardous areas to manually remove tie-downs prior to aerial cargo drops. Also speeds cargo jettisoning in case of emergency.

**New cargo platform** featuring an air bag which absorbs some of the landing shock during aerial cargo drops was tested by the 6511th Parachute Development Test Group. Reduces ground impact in typical case from 35g to 12g, thus minimizing damage and also cutting number of parachutes required.

**Electrical Equipment:** Jack & Heintz and Westinghouse Electric Corp. worked with WADC on development of a lightweight direct current generator control panel, known as the B-3, to replace five previously used controls scattered throughout the aircraft.



**PALLET LOADING SYSTEM** for use with a Douglas C-124 uses prime mover as power source. Hatch in rear of floor opens when cargo is to be parachuted out, while crew member controlling cargo drop sits at desk in rear. Gravity and wheels on pallet make possible automatic movement.

**Ruckstell-Hayward Engine Co.** developed for ARDC prototypes of miniature engine-generator sets to meet limited weight and space requirements for beacon power supplies and emergency electrical power units of 50 to 100 watts continuous output. One of these miniature engine-generator sets has the power capacity of three conventional batteries weighing 240 pounds and providing 100 watts for 24 hours.

**General:** Stratos Division of Fairchild Engine and Airplane Corp. and WADC completed development on an air expansion turbine for aircraft cabin cooling. Unit, with maximum air flow capacity of 65 pounds per minute, "was the first known application of a variable nozzle to a turbine of this small size" to provide greater cooling capacity on the ground and during high altitude flight.

Landing gear warning device was

developed to signal pilot through his headset if the aircraft's landing gear is not down and locked when the throttle is set below minimum speed.

**Stanley Aviation Corp.** developed for ARDC a cartridge-actuated, automatic-opening lap belt, another step toward achieving completely automatic ejection from high speed aircraft (see photo). Belt was successfully used in dummy test ejections from altitudes as low as 300 feet.

**University of Missouri's School of Mines** developed a new and unique process for depositing titanium on copper, steel and possibly other metals for ARDC. Process exploits reaction of finely divided titanium alloying with the surface of material to be coated.

**East Coast Aeronautics, Inc.** completed an F-80C airframe fabricated of magnesium alloy for static tests and started work on another for flight test.

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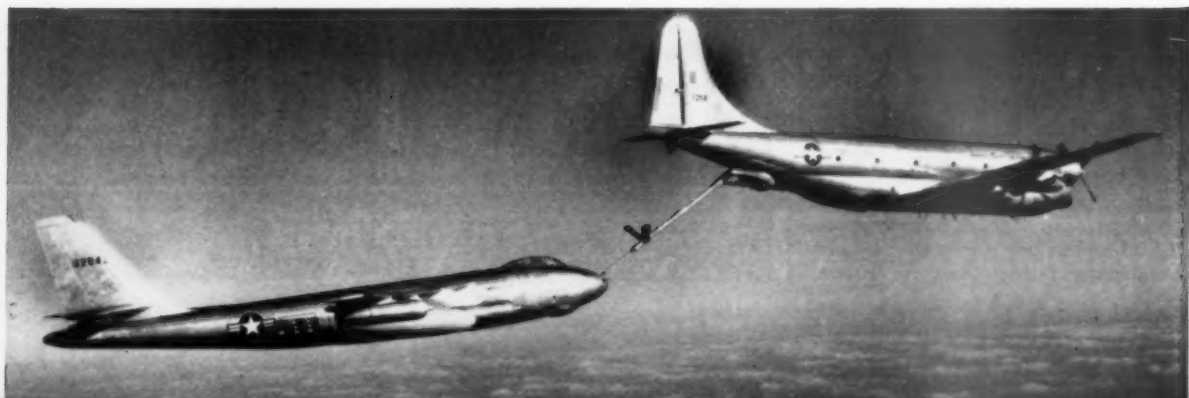


THE 500th C-97 Stratofreighter took to the air from Boeing's Renton plant near Seattle last month. In 1950 the 175,000-pound plane became the first transport in production with radar as standard equipment.

## Half a Thousand Stratofreighters



RADAR SYSTEM (APS-42A) consists of six units: antenna, receiver-transmitter, synchronizer, two indicators, and control box. System has range of 200 miles. Indicator is shared by pilot and co-pilot (above, left); navigator has similar scope. Right, above, the antenna and its plastic radome covering. Below, a KC-97 in its familiar role as refueling tanker for B-47's.



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## West Coast Talk

By Fred S. Hunter

**T**HERE'S a four-word phrase of more than passing significance in the Douglas Aircraft Co.'s annual report. It mentions Air Force selection and purchase of the B-66 "in three different models." The B-66 and the RB-66 have been announced. What's the third one?

This is the first hint that Douglas has sold still another version of the twin-jet craft originally developed for the Navy. Latter is the El Segundo division's A3D. The B-66 and RB-66 conversions for the Air Force will be products of the Long Beach division. Douglas won't elaborate on the third Air Force model, or even identify it, although the annual report revealing that it has been purchased by the Air Force was passed and approved by the Security Review branch of the Department of Defense.

There have been reports that Douglas had an airplane set up for production at Tulsa after the B-47 is phased out. Most of the guessers out this way figured an Air Force version of the F4D might be the plane. Now they are readjusting their sights. That's a big plant Douglas has at Tulsa.

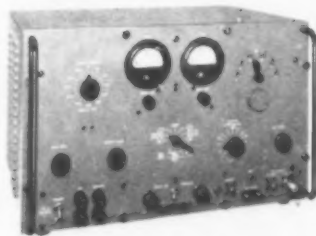
Word is out that Boeing will have a supplemental test base at Larson AFB, Moses Lake, Wash., for B-52 production flight test away from Seattle. A year ago, the Air Force announced plans to set up a test base at Spokane, but this was later cancelled due to some undesirable features of the base plus the fact that mineral deposits in that section made it impossible to lay out a suitable compass rose and instrument calibration site.

How many airlines are operating in the Pacific? Pacific-Alaskan division of Pan American World Airways checked recently and found it had 25 direct competitors in that area. You don't believe it? Count 'em off yourself: United Air Lines, Northwest, Philippine Air Lines, Canadian Pacific, Japan Air Lines, British Commonwealth Pacific, Tasman Empire, Qantas Empire, Air France, Cathay Pacific, Air Vietnam, British Overseas, Thai Airways, Indian National, KLM, Bharat Airways, TAI, SAS, Union Burma Airways, UAT, Malayan Airways, Air Ceylon, Garuda Indonesian Airways, Civil Air Transport and Hong Kong Airways. Add Transocean, which does a pretty fair non-scheduled business to Hawaii and Guam, and you have 26.

As might be expected from such complicated gear, Convair keeps having ski trouble with the XF2Y Sea-Dart. Still hasn't reached the point where the skis can be tried out in open water. Power is another problem. Plane is underpowered with the two Westinghouse J34's installed for expediency in the prototype, and it is still a question whether the engine situation may compel Convair to re-engineer the craft for a single, bigger engine. If so, it would be expensive.

People who don't care for Howard Hughes are expected to take more than casual interest in the F-86K, which is to be built in Italy. The F-86K will incorporate the fire control system which was developed by North American Aviation's Downey division. The all-weather interceptor which North American itself builds, the F-86D, has the Hughes Aircraft Co.'s E-4 fire control system. The E-4 is not government furnished equipment and it was put into the F-86D by none other than North American. But the people who don't care for Howard Hughes seem to feel that North American may have not had much choice in the matter and they are therefore most interested in seeing how the fire control system which the manufacturer developed but didn't use in his own plane works out in the same plane made in Italy.

The competition between American Airlines and TWA for the New York non-stop business out of Los Angeles is something fierce. AA is installing an Admirals' Club, complete with bar, at the Los Angeles International Airport, and TWA is putting in an Ambassadors' Club, which also is complete with bar. Pity the poor guy who is both an Admiral and an Ambassador. (Don't look at me.)



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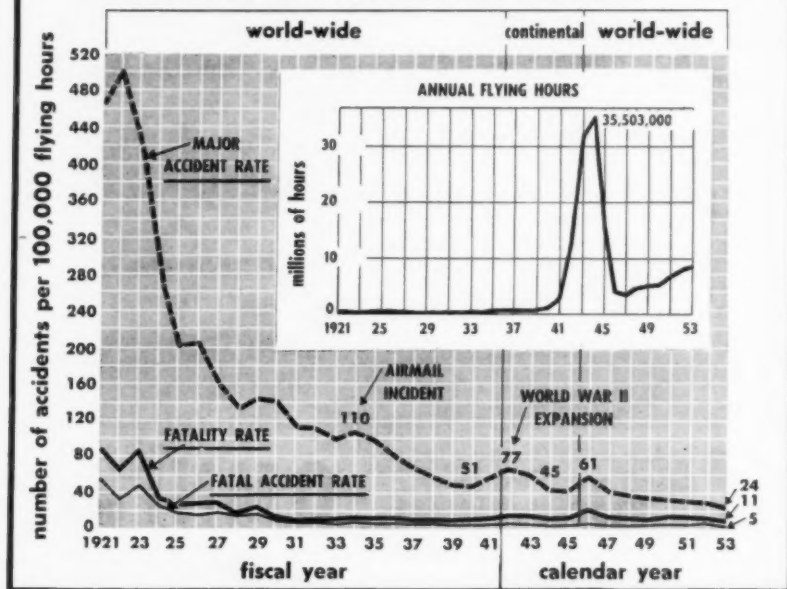


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## THE USAF'S ACCIDENT RECORD



## USAF Major Accident Rate Hits New Low

Fatality rate also drops as Flight Safety Research group wins wider acceptance in Air Force.

By WALTER A. KILRAIN

**L**AST YEAR the Air Force, with some eight and one half million flying hours logged during 1953, brought its tally of fatal accidents down to five for each 100,000 flight hours. The fatality rate dropped to 11 per 100,000 hours in the air, and the major accident rate fell to a record low of 24 for the same amount of flying.

The first two of these indicators of USAF flying safety have been held down to much the same level since the early Thirties, but the new low in the major accident rate marks a victory that is worthy of note.

Major accidents in what was then the Army Air Corps were occurring at the rate of about 500 per 100,000 flying hours at the peak in 1922 (see chart, above). Advancements in the science and increased attention to the problem brought the curve down—sometimes erratically—to a prewar low of 51 in 1940.

Wartime expansion, with its emergency conditions and untrained personnel, lifted the record for the continental U. S. to a rate of 77 in 1942, but it fell immediately thereafter, only to climb again—paradoxically—with the end of the war.

By 1946 the hasty exodus of experienced personnel had lifted the rate

back up to 61, even as the total hours flown were being cut to less than a third of the 1945 figure.

Since then the curve has gone steadily downward. For that achievement a significant part of the credit must go to an organization that was founded in the same dark year of 1946: the Directorate of Flight Safety Research.

Located at Norton Air Force Base, San Bernardino, Calif., Flight Safety Research is one of three organizations under the command of Maj. Gen. Victor E. Bertrandias, Deputy Inspector General. Together the three groups form the core of a drive to incorporate as much safety as possible into the operations of the USAF.

To deal with the problem of flight safety in one of the world's largest forces, Bertrandias has available a force of 622 military and just over 200



Bertrandias



O'Keefe

civilian employees. His operating budget is under \$6.5 million per year:

• **Flight Safety Research** (assigned strength: 242 people) is responsible for the bulk of the work in flight safety through research and engineering. It reviews reports on all USAF accidents, and to about eight per cent of them it sends out its own teams of investigators. These are usually accidents involving unusually large death tolls, new plane types, new engine types, or cases of comparable nature. On the basis of such reviews and investigations the directorate then makes recommendations to the Air Staff and to major USAF commanders. Director: Brig. Gen. R. J. O'Keefe.

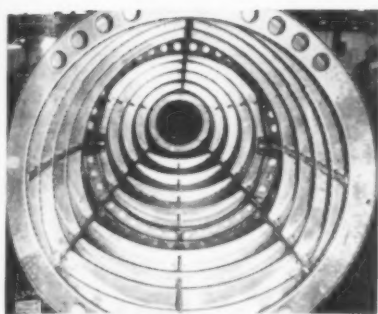
• **Procurement Inspection** is responsible for the administration of Air Force contracts and procurement inspection as carried out by major USAF commands, as well as for the AF's local purchase program. Director: Brig. Gen. W. T. Thurman.

• **Readiness and Materiel Inspection** is responsible for monitoring the Air Force's inspection system. It is also charged with inspecting USAF activities with the exception of procurement. The latter function involves estimating the combat readiness of fighting units and the efficiency of supporting groups. Director: Maj. Gen. T. O. Hardin.

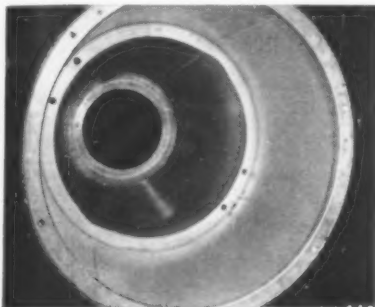
Working as they do under the direction of the Inspector General's Office, all three groups have had to cope with the suspicion on the part of AF commands that they were primarily out to gig somebody who was caught out of line. Last fall a conference was held at Norton for commanders of the Training Command that, in the opinion of Brigadier General O'Keefe, succeeded in dispelling that notion and selling another segment of Air Force opinion on the idea that FSR exists to make constructive suggestions as a management service.

"It was felt," commented O'Keefe, "that the Training Command conference personnel came to the meeting with qualms and much doubt as to the benefits to be derived . . . [they] were surprised to find that the Air Force safety consciousness would not interfere with the training of student pilots and would not result in a lessening of the quality of the pilot graduate."

The conference, together with a sharply accented emphasis on Air Force safety that came in the spring of 1953, coincided with a record year in Air Force flight safety. Bertrandias, O'Keefe, and those who are working with them are, it seems safe to assume, out to prove in 1954 that the conjunction of those developments was not a mere coincidence.



MATADOR nose section previously involved complicated fabrication (above). New method of spot-welding (below) to three formers cuts time, costs, and weight.



## Conservation Stressed At Glenn L. Martin

The industry-wide fight against the rising cost of aircraft is being pushed at the Glenn L. Martin Co. in Baltimore, Md., by means of a program based on the theory that "Conservation is a way of life."

In practice this has resulted in attempts to prevent waste rather than concentrate on collecting the scraps after the damage has been done. Such salvage operations, while still part of the Martin plan, have taken a back seat to extensive efforts at coordination during production planning.

As a design begins to take shape in Martin's engineering division, the manufacturing division provides tool engineers to work on the project. These engineers are able to start to prepare the tooling that will be needed later, and can also suggest the most economical means of manufacturing parts before part designs are decided upon.

Production lines, machine utilization, and other production factors are also planned concurrently with the development of the design, reducing or eliminating time required for redesign later.

Other cost-cutting procedures include the inspection of parts at several points in the manufacturing process before they are incorporated in complicated assemblies, maintenance of a neat plant, use of electrically handled tubs for transportation of parts, and long racks for storage of material.

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# WESTERN AIRLINES

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## Russians Push Engine Development Program

Widely dispersed facilities begin to turn out original work; production details described.

By ANTHONY VANDYKE

**T**HE Soviet Union's aircraft engine industry, long capable of working efficiently from foreign designs (obtained through license agreements or by less ethical means), has now advanced to the point where it is able to incorporate major improvements in the powerplants which it copies.

This important news, recently confirmed by USAF evaluation of the improved Nene in the MiG-15 from Korea (AMERICAN AVIATION, March 15), means that it may soon be possible for Russian designers to develop engines without having to resort to foreign brains.

Until recently it had always been found that Russian versions of American, British, French, and German engines were consistently inferior to the originals. Moreover, once the Soviet industry put an engine into production the design was "frozen" and little attempt was made to improve it by local development work or by the incorporation of refinements introduced by the company that designed it.

Today, AMERICAN AVIATION's intelligence sources report, not only is engine production progressing well (there are some 20 factories manufacturing turbojet/turboprop powerplants) but development work is getting attention on a scale that it never previously had. A large percentage of such plants have been built underground, in apparent anticipation of the "air atomic" strategy now in the forefront of U.S. military thinking.

Since 1930 there has been in existence a "Central Scientific Research Institute for Aircraft Powerplants" which today controls a multitude of research establishments scattered all over the Soviet Union. This institute receives all intelligence on foreign engine designs and modifications and has the assignment of incorporating them in existing engines as far as is possible. Specific projects are assigned to top Russian designers such as V. Y. Klimov, N. B. Chelomey, and A. A. Mikulin, who have their own design teams and development plants. Production factories are thus relieved of all development work.

To explain the Russian development system the Mikulin design team may be used as a typical example. Alexander Mikulin has his design offices in a Moscow factory (No. 300) which contains test branches and a small quantity of very modern tooling in addition to drawing offices. In this plant a design is carried through to the prototype and pre-production stages. Every engineer and worker is hand-picked and working conditions are extremely good.

The development work performed in plant No. 300 is carried to the production stage in four other big factories in various parts of the Soviet Union: plant No. 500 at Tushino, Moscow (this factory produces parts for guided missiles as well as engines); plant No. 45 in Moscow; plant No. 75 in Kharkov; and plant No. 466, a special division of the automobile factory in Gorky.

Whereas Mikulin's plant No. 300 does not do production work, the headquarters of three other designers engage in production as well as development.

W. J. Klimov has his offices in one of the largest plants in the Soviet Union, a facility located at Chernigovka, 12 miles east of Ufa. Here, in this plant No. 26, there is a labor force of

AMERICAN AVIATION



# RYAN RANGE EXTENDERS ADD COMBAT MILES



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20,000 working on different phases of engine design, development and production.

Another development and production factory is plant No. 19, at Molotov, which was headed by the late A. D. Shvetsov. A third factory of this type is plant No. 24, the headquarters of M. R. Flissikiy.

The greatest agglomeration of engine plants in the Soviet Union is still

in the Moscow area despite a firm dispersal policy. Russia's main gas turbine production centers, however, are well away from Moscow.

There are at least 20 factories in Moscow and its vicinity connected with engine production. Plant No. 20 produces parts including carburetors and pumps. Plant No. 23 is an old-established factory that was formerly located in Leningrad. Plant No. 24 produced

500 engines a month in 1944 and has 18,000 workers. Plant No. 25 is an old factory that does repair work and produces parts.

Plant No. 33 builds carburetors, propellers, magnetos and other parts; it has 4000 workers. Plant No. 45 assembles and tests engines. Plant No. 69 is an engine producer. Plant No. 114 manufactures magnetoes and spark plugs. Plant No. 300 is Mikulin's development factory. Plant No. 84 (at Khimki) builds engine parts. Plant No. 124 (at Stalinsk) is connected with the engine industry but nothing more is known about it.

There are two plants at Yankoye Pole, near Moscow. One (No. 124) builds components including oil coolers, whereas the other is a very large underground engine production center.

In the Tushino area of Moscow there are three plants: No. 500 (formerly No. 81), which builds parts for guided missiles as well as engines; No. 82, an engine plant, the status of which is unknown; No. 17, an underground plant producing gas turbines and piston engines with some above-ground facilities (including a wind tunnel).

Finally in the Moscow area there is Plant No. 28, which builds propellers and landing gears, and another underground production factory. • • •

## Russia's Engine Production Plants

*Besides those mentioned in the text, components of the Soviet engine industry are located as follows:*

**BAKU.** This factory was built after the war and is now producing gas turbines.

**KHABORVSK.** Production and overhaul of piston engines and gas turbines.

**KHARKOV** (Plant No. 75). This factory has been building engines since 1941 and for the last five years has been engaged in gas turbine production.

**GORKY.** Large-scale production of engines in part of automobile plant.

**GORODOMLIA.** A group of German rocket motor specialists worked here after the war, but it is now being used as transit camp for Germans returning home.

**IRKUTSK.** Production of gas turbines since 1951.

**KAZAN.** (Plant No. 43). Piston engines have been produced here since 1942.

**KIEV.** (Plant No. 43). Mainly engaged in repair work since 1941. A newer plant in the Kiev area has been producing gas turbines for the past three years.

**KRASNOGORSK.** Producing engines since 1951.

**KUIBYSHEV.** There are three large plants here. A piston-engine factory, a gas-turbine plant with underground facilities, and development center for gas turbines and rocket motors.

**LENINGRAD.** Plant No. 9 is an old facility which produces engine parts. Plant No. 25 is another old factory producing parts and gearing. Plant No. 48 is another parts factory which was being rebuilt in 1948; its current status is uncertain. Mention has also been made of a plant No. 218 but this is believed to be the same as plant No. 9.

**MAGADAN.** Gas turbines in production since 1951.

**MAGNITOGORSK.** Piston engines and gas turbines in production since 1948.

**MOLOTOV** (Plant No. 19). A very large facility employing 8000 workers, which has been producing gas turbines since 1950.

**NISHNI-TAGIL** (Plant No. 27). Repair factory.

**NOVOROSSISK.** This factory is reported to have been moved to Samarkand.

**NOVOSIBIRSK** (Plant No. 153). Builds parts and fuel tanks. There are also two engine plants. One builds pis-

ton engines and the other has been producing gas turbines since 1950.

**NOVOCHERKASK** (Plant No. 7). An old, small plant which builds parts.

**OMSK** (Plant No. 29). This facility may have been used by plant No. 479, which was evacuated from Zaporozhye during the war.

**OSIPENKO** (Plant No. 49). Mainly engaged in producing propellers and wheels. About 2000 workers.

**PELMAN** (Plant No. 26). This factory was moved from Rybinsk to Pelman during the war.

**PENZA** (Plant No. 7). An old factory specializing in propeller production.

**PODBEREZYHE** (Plant No. 1). Development center used by German powerplant specialists (between 1947 and 1953).

**RYBINSK** (Plant No. 26). Evacuated to Pelman during the war, this plant has been rebuilt for large-scale production of piston engines.

**SARAPUL** (Plant No. 11A). Diesel engines, carburetors and instruments. There is also another plant (No. 40 or 41) which builds and repairs conventional piston engines.

**SERPUKHOV** (Plant No. A-11). Located in the woods near Psarevo, east of Serpukhov, this is a top secret plant producing axial-flow gas turbines.

**SMOLENSK** (Plant No. 35). Repair work.

**SVERDLOVSK.** Three plants here build gas turbines, piston engines, and engine parts, respectively.

**STALINGRAD.** About 10,000 workers are building engines.

**TASHKENT.** Has been building gas turbines since 1949.

**TULA** (Plant No. 10). Built in 1938, this factory has 6500 workers.

**UFA** (Plant No. 21). Produces gas turbines.

**UFA-CHERNIGOVKA.** Produces gas turbines and piston engines. Has about 20,000 workers.

**VORONEZH** (Plant No. 16). Labor force of 8000 builds gas turbines and does repair work. Supersonic wind tunnel built in 1952.

**VOROSHILOV.** Producing piston engines and gas turbines since 1951.

**VLADIVOSTOK.** Producing gas turbines since 1951.

**YAROSLAVL** (Plant No. 65). Engine parts, and various armaments.

**ZAPOROZHYE** (Plant No. 479). Rebuilt in 1948, this big plant is now producing gas turbines. • • •

## Big Aircraft Firms May Build Gyrodyne 'Copters

The Gyrodyne Co. of America, St. James, L. I., N. Y., is now working on six designs and may join forces "with certain of the large aircraft companies" in developing some of them. Peter J. Papadakos, president, has announced in a stockholders' letter. He also reported that John A. Roosevelt, son of the late President, had been elected board chairman.

Among the current Gyrodyne designs:

- Model 33, a two-place helicopter, which, Papadakos said, will be produced with private capital.

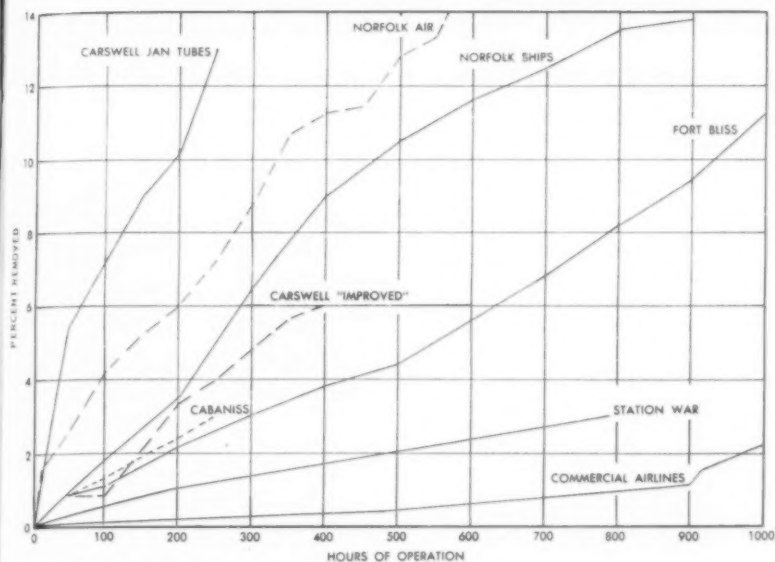
- Model 28, an anti-submarine helicopter.

- Model 2D, an ambulance helicopter usable also for liaison and commercial service.

- Heavy cargo helicopters with payloads ranging from 20 to 100 tons.

- A medium sized military convertiplane.

- Large convertiplanes for military and commercial use carrying up to 72 helicopters and cruising at more than 240 mph.



TUBE FAILURES for airlines, armed forces radio station, and the military. Stable maintenance staffs are credited with good airline record.

## How Reliable is the Electron Tube?

A great deal depends on who maintains the equipment, Arinc survey of military use shows.

By JOSEPH S. MURPHY

DESPITE the eventual promise of greater electronic equipment reliability in military operations through the use of transistor and magnetic amplifier circuitry, the bare fact is that the electron tube will hold the key to both reliability and cost for a long time to come.

Just how big a role the electron tube plays today in dictating the performance of military equipment and how great an improvement can be expected was never brought out more pointedly than in a recent prediction by Aeronautical Radio, Inc. Arinc engineers estimate that tube improvement programs now under way can save the three services as much as one-half billion dollars annually—even if the tubes were to cost five times as much as the original types.

In the release of its first unclassified report of a two-year-old Military Tube Reliability Project being operated for the Army, Navy, and Air Force, Arinc documents the case for greater tube reliability.

Highlights of its 97-page report, which is based on the study of more than 45,000 tubes removed as defective at eight military bases, were these general conclusions:

- **High removal rates:** Although individual types show a removal rate

as high at 7.0 per 100 sockets per 100 hours, the average for all types is between 1.0 and 3.0. Improved tubes already observed show rates only  $\frac{1}{4}$  to  $\frac{1}{2}$  that of their prototypes, and the commercial airlines' removal rate with the better tubes is only 0.3.

- **Unnecessary changes:** Two out of every six tubes removed appear entirely free of defects. One other shows the results of mishandling, two more are deterioration failures which could be detected and removed before they caused malfunction. Only one of the six actually causes equipment failure.

- **Complexity:** Present-day equipment is too complex for efficient maintenance in field operations, and a large proportion of maintenance personnel lack the time or training to do the job.

- **Marginal design:** Equipment now being designed barely succeeds in performing its operation, with no reserve margin for unfavorable conditions or emergencies.

The actual breakdown of more than 30,000 tubes removed during the program, as later analyzed by Arinc and Cornell University electrical engineering department, showed these results:

No defect in 31.8% removed.

Electrical defects in 28.7%.

Mechanical defects in 21%.

Miscellaneous defects in 18.5%.

One point in evidence was the effect of the widely differing military

operations and varying maintenance skills on the types of tube failures recorded.

A look at the results from seven of the eight bases under surveillance showed:

- **Cabaniss Naval Air Station:** Superior maintenance—a combination of skilled military technicians and technical representatives of manufacturers—kept returns in the no-defect and miscellaneous category low. New equipment in use here showed low electrical defects, but mechanical failures ran high due to series-parallel connections of tube heaters.

- **Fort Bliss:** Excessive handling of tubes in troubleshooting problems assigned by instructors at electronics school here brought high mechanical and miscellaneous defect returns. Low percentage of electrical troubles suggest good equipment design with a minimum of critical sockets.

- **European Army Command:** Mobile nature of equipment used here showed the lack of facilities for repair and maintenance with a high rate of no-defect removals.

- **Armed Forces Radio Station WAR:** Experienced maintenance personnel and a rigid maintenance schedule aimed at anticipating tube failures brought high returns in the electrical defect category. Mechanical and miscellaneous returns were low.

- **Norfolk Naval Air Station:** Combined in the report with Carswell and MacDill Air Force Bases because of their use of similar maintenance procedures and systematically trained but inexperienced enlisted personnel. No-defect removals and mechanical defects here ran high. Electrical troubles were lower.

Arinc's explanation for the lower removal rates in commercial airline operations compared to that of the military is the carriers' less complicated equipment and more stable maintenance staffs.

As for military maintenance proficiency, although it can be improved in peacetime, in case of national emergency it could not be expected to be any better than it is now, and would probably be worse. The answer here, according to Arinc, is emphasis on equipment design for easy servicing—not on improvement of maintenance.

Just what effect maintenance skill has on electronic equipment performance is next on Arinc's study list. In a program to start soon, normal airline maintenance, and high-level maintenance performed exclusively by manufacturers' technical representatives will be compared in controlled tests. The results should prove conclusive. . . .



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## Million Dollar Fixed Base Operator

Piedmont Aviation in Winston-Salem, N.C., expects to better that sales record by 20% in 1954.

By LOIS C. PHILMUS

**S**ALES in excess of one million dollars were recorded in 1953 by the fixed-base division of Piedmont Aviation, based in Winston-Salem, N. C. An 18% to 20% increase in total volume is anticipated for 1954.

Diversified services combined to put Piedmont's FBO into the million dollar class. The following increases in gross sales volume were recorded over 1952:

- **Aircraft sales up 116%** over 1952, with 95% of sales made to dealers and other fixed base operators. Piedmont has had a Piper distributorship for North Carolina and majority of Virginia for about 12 years.

- **Parts and accessories increased 37.33%** in 1953. Representing about 43 manufacturers, Piedmont considers the distribution of parts and accessories to be its most lucrative field. Two salesmen are constantly "on the road," traveling by airplane, calling on customers and prospective customers in Virginia, North Carolina, South Carolina, West Virginia, eastern Tennessee, and northern Georgia.

- **Gas and oil sales up 5.95%.** The only operator at the Winston-Salem Municipal Airport, Piedmont has recorded a steady increase in fuel service over the years.

- **Overhaul and maintenance up 19.55%.** Twenty-three corporation aircraft users are considered steady customers. Most of these operate twin-engine aircraft ranging from D-18S to DC-3's. In addition, Piedmont services the majority of the single-engine aircraft within a 250-mile radius of its base.

The one drop shown by the operator was in flight instruction, rental, air taxi, and charter operations, which combined in a 10.23% decrease.

Although profitable operation is a somewhat new experience to most fixed base operators, it is not to Piedmont. Founded in 1940 by Tom Davis, who now serves as president, the operation has shown a profit for nine of its 13 years.

Heading up the 68-man operation is Robert S. Northington, vice president, who joined Piedmont in 1945 as aircraft sales manager. He became a vice president and director of the corporation in charge of the fixed-base operation in January, 1947.



Davis



Northington

Northington's staff consists of 32 technicians in engine and carburetor overhaul; 10 in aircraft and propeller overhaul; eight linemen on seven-day, 24-hour shifts; six stock and stores agents under a manager; a purchasing agent; two flight instructors; one Link instructor; three salesmen; two operations flight clerks; and the remainder in clerical and accounting capacities.

Representing a \$750,000 capital investment (including 14 aircraft), the fixed-base facilities are currently crowded into two hangars and scattered shops. Sometime later this year Northington expects to increase his work area to about 9600 square feet for maintenance and overhaul and to have additional hangar space for corporate aircraft lessees.

This will take place when Piedmont Airlines moves into its new facilities, to be constructed near the field. Seven companies currently use the base for hanging their aircraft.

Classing parts and accessories as the most important phase of its sales operation, Northington attributes the success to: (1) Salesmen making regular calls within a 250 mile radius; (2) off-the-shelf quick delivery because of adequate stocking; (3) 24-hour delivery on receipt of order whenever requested; (4) easily-readable catalog left with FBO customers.

Probably most important of all, Northington feels, is Piedmont's ability to service the products it sells.

"We are in a position to service the engines, radios, and accessories we sell," he states, "and can make all installations necessary."

Piedmont's fixed-base shops are in a position to do complete engine and airframe maintenance and overhaul on all equipment through the Lockheed Lodestar class. A \$250,000 inventory of parts and accessories is maintained. This



includes minor and major overhaul, inspections, and conversions.

Although the fixed-base operation is completely divorced from the airline, the airline shops do contract work on DC-3 aircraft in different work areas. The airline also contracts to do accessory overhaul.

In addition to its corporation and fixed-base customer roster for engine overhaul, the fixed-base operation performs engine overhaul services for Piedmont Airlines and Allegheny Airlines. Northington hopes to count one or two more local service airlines as customers in the near future.

Employee policies and low turnover are also credited by Northington for the operation's success. Shops are non-union. Employees are in on profit-sharing plans, group insurance programs, and an employee stock option plan. Supervisors and department heads average 10 years service each and many of the maintenance personnel have eight or more years to their credit.

### Other Features

Other features of the operation include: a specially designed engine test cell where engine run-up is almost completely deadened, engine store room where customers may store spares at no extra cost, completely equipped carburetor shop, and large dope room.

Piedmont maintains a small division at Norfolk Municipal Airport, under the management of Dick Morris. Here service is provided to the Flying Tiger Line and some non-scheduled carriers. A successful air taxi operation is based here. Two licensed mechanics and seven linemen are on constant duty. Facilities are contained in two hangars.

Northington makes it very clear, however, that future plans do not call for setting up a fixed-base network. "We have no intention of going into competition with our customers," he states.

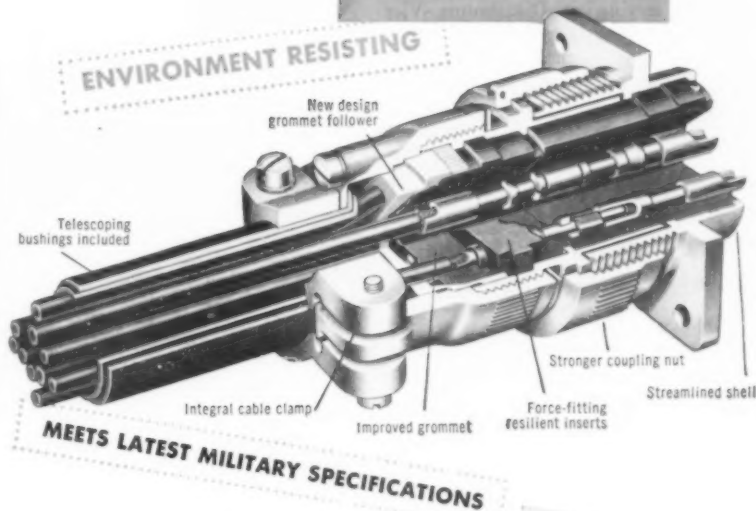
Plans for the future call for increased volume in corporation aircraft conversions and additional hangar space.

Northington anticipates a particularly good year in aircraft sales, primarily because of the production of the Piper Twin Apache. He expects continued volume and an increase in parts and accessories sales and overhaul work. He sees radio sales, installations, and conversions developing rapidly. Test equipment for VHF, omni, ILS, and DME will be incorporated in the immediate future. His ambition is to make Piedmont fixed base a one-stop-only service for customers.

One indirect factor in the success, Northington states, is Tom Davis' atti-

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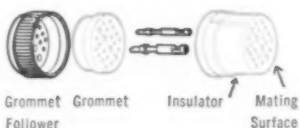
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tude toward industry cooperation. He encourages participation in the National and State Aviation Trade Association and the Aviation Distributors and Manufacturers Association. Although active participation is time-consuming, Davis feels that the end and long range results are more than worthwhile.

In line with this Northington is currently serving as Distributors Vice President of ADMA and is a member of the steering committee of NATA. He also is a past president of this latter organization. In addition, he has served as president, secretary, and treasurer of the North Carolina Aviation Trades Association.

## Morey Resigns as North Central Head

Howard A. Morey has resigned as president and general manager of North Central Airlines and Hal N. Carr, a director and former officer of the company, has been elected to succeed Morey. Carr, who was NCA executive vice president from 1947 to 1951, when he joined McKinsey & Company, management consultants in Washington, D. C., assumes his new duties April 15.



## Extra Section

By William D. Perreault

USING "a poor boy's version" of United Air Lines' daily operations conferences, Braniff Airways has made major improvements in its "on-time" operation, according to the company's newly elected vice president of operations, R. V. Carleton. In February, best month under the new program, 64.9% of Braniff's flights departed exactly on schedule and 86% left the ramp within 15 minutes of published schedules. Daily delays were only 25.2 out of more than 390 scheduled departures. Maintenance delays reached a new low of 3.6 per day, an improvement of 50% over the best previous month.

CAA has compiled a list of 17 well qualified men in operations, engineering, and maintenance who are leaving government service under the current reductions in force. The list, which includes educational and work backgrounds along with ages and salary requirements, is available from: Personnel Officer, Civil Aeronautics Administration, Washington 25, D. C.

It's time some of the old-timers in aircraft radio got together, in the opinion of F. C. McMullen, supervisor of government communications sales for Western Electric. It has been 25 years since plane-to-ground radio started commercially, and McMullen would like to get together with some of his fellow pioneers in the field "while we can still walk about," as he puts it. His proposed meeting place: the RTCA meeting in Philadelphia on April 22 and 23.

We dropped into Collins Radio's relatively young division in Dallas recently to visit Jim Flynn, former Pan American pilot who heads up this activity. They've been expanding fast with initial 50,000 square feet of space supplemented by 40,000 more in main plant, plus 25,000 for the Texas Division's Engineering Laboratory. Division has unusually large amount of non-military business for an electronics producer. Flynn is providing Theil Sharpe, regional sales manager of the division, plenty to work with, both newly engineered products and the parent company's well known line. The accompanying cartoon by Fred Schlessman, showing the use of Collin's Deerhorn localizer antenna and Bull Ring glide slope antenna for precision skiing is from the cover of the *Collins Column*, the company house organ.



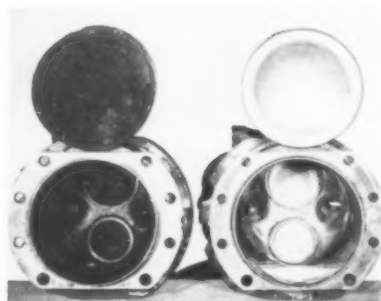
CAA's Jim Beasley, chief advisor for the International Region in San Francisco, has these statistics to report on three years operation by seven airlines operating via the Honolulu-Wake-Tokyo route to Korea in the Pacific airlift: 607,181 aircraft hours logged; 233,613 passengers; 19,235,335 pounds of mail; and 93,704,217 pounds of cargo carried in 8835 trips totaling 121,976,010 aircraft-miles. Noting that this was comparable to 4417 trips around the world, Beasley saluted the safety record of the group (which included Pan American, United, Transocean, Seaboard and Western, Cal-Eastern, Overseas National and the Flying Tigers) with the comment: "And not one soldier got his feet wet."

Bill Long's Dallas Aero Service at Love Field, Dallas, is doing a big job for business aircraft operators with a very complete facility ranging all the way from an A-1 radio and electronics service to aircraft conversions, engine, accessory and instrument overhaul. Long, one of aviation's finest people and a kingpin in the Pioneer Air Lines operations, has brought in Byron Post, brother to Wiley Post, to direct the outfit's activities, which are now grossing over \$1 million annually.

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# Maintenance Bulletin Board



IN-PLACE CLEANING of helicopter engine (left) restores power, cuts maintenance costs. Above, cylinder before and after.

## Black Walnut Shells Clean Cylinders

A new engine combustion chamber cleaning device, patterned after a unit used for several years to remove carbon buildup and foreign deposits in automotive engine cylinders as a routine maintenance operation, is making its bid in the aircraft and helicopter engine servicing field.

In early applications to engines in Hiller H-23 helicopters and Cessna L-19 liaison planes, it has shown promise of restoring "lost" engine power and reducing maintenance costs.

The unit is called the Kent-Moore Aero-Power combustion chamber cleaner and is being marketed by the Rice-Peterson Sales Co. of Palo Alto, Calif. Basically it is a pressure-blast type of device, using a specifically prepared non-abrasive and non-corrosive cleaning agent (black walnut shells).

The blast material is introduced into the combustion chamber through one spark plug port at a pressure of 40-60 psi, and the ricochet action of the cleaner chips carbon and foreign deposits from cylinder, piston, and valve surfaces.

Used cleaning material and carbon deposits are blown out of the cylinder through a return hose coupled to the other spark plug port. The complete operation takes from five to six minutes per cylinder.

The machine operates from normal hangar air pressure and is completely equipped with its own pressure regulator, metering chamber, and a special nozzle which swivels a full 360° and has a 4°-5° tilt.

First real success of the cleaner in aviation use, according to G. E. Rice, president of the Rice-Peterson firm, was several years ago during the full-throttle

tie-down testing of the Hiller H-23 helicopter. This type of testing subjects the helicopter engine to conditions beyond its design limitations and, in the case of the H-23, resulted in severe combustion chamber carboning and removal of six cylinders in the first 50 hours of testing.

At that time the automotive version of the A-P cleaner was brought into play.

During three subsequent tie-down tests using the cleaner at scheduled 30-hour intervals, no premature cylinder changes or unscheduled shut-downs for engine maintenance were recorded. Translated into improved helicopter performance, an increase of 80 feet per minute in rate of climb was evident.

In recent demonstrations for the U.S. Army at Fort Eustis, Va., similar results were obtained on another H-23 and two Cessna L-19 liaison aircraft.

The L-19 engines both had about 350 hours of service, with one developing 2110 rpm and the other 2200. After the combustion chamber operation, rpm readings were 2200 and 2250, respectively, for an estimated power increase of 7% and 13% on the engines.

The H-23 helicopter at Eustis, according to Rice, could not be flown before cleaning due to a reported extremely rough operation, indicating high rpm drop-off on the right magneto. Using the new cleaner, and without spark plug replacement or servicing of any kind, the engine performed normally.

Next step in the program at Rice-Peterson is to apply the process to larger transport type aircraft engines. Company officials feel that its potential success is not limited to light aircraft

and helicopters, and that their contention is borne out by the interest shown by some airline operators toward testing it in order to combat similar cylinder problems and power decline experienced as engines accumulate time in service.

## MAINTENANCE BRIEFS

Douglas DC-7's are factory-equipped with Fluid-Tight rivets manufactured by Pastushin Industries, Inc., Hawthorne, Calif. These are modified, close-tolerance, flush-head AN 426 or round-head AN 430 aluminum alloy rivets designed for repair and maintenance of sealed assemblies such as integral wing fuel tanks and pressurized fuselage areas.

American Airlines has adopted an employee suggestion to extend the service life of special lower intake pipes on Pratt & Whitney R-2800 CB-16 engines by silver-soldering the pipes internally where cracks commonly occur. AA engine shop mechanic Virgil Gates was awarded \$25 for the idea.



## Versatile mobile floodlight

and electric power unit shown here is development of Mahan & Eldridge Co., 1073 N. Owasso, Tulsa, Okla., for Douglas Aircraft Co.-Tulsa. Bank of 300-500 watt floodlights can be adjusted at any height up to 19 ft. Lighting and electrical arrangement can be altered to suit needs.

**THIRD INTERNATIONAL  
AVIATION TRADE SHOW  
MAY 5, 6, 7, 1954**

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## New Products



## New Anti-Icing System Announced

Announcing a new electro-thermal mat for aircraft de-icing and anti-icing, D. Napier & Sons Ltd. of London claims 1500 development flight hours, ten million civil air route-miles. Tests have included standards required by British Ministry of Supply, Air Registration Board, and British Standards Institution.

- **Abrasion:** 100 take-offs and landings with a Camberra at Khartoum, tropical trials airfield.
- **Rain erosion:** 220 hours at high speed on a Venom.
- **Flexural fatigue:** element has no effect upon parent structure up to Wohler fatigue limit.

- **Strength:** mat has withstood 48 x 10<sup>6</sup> reversals at  $\pm 0.153\%$  strain, fractured only after 4.1 x 10<sup>6</sup> reversals at  $\pm 0.176\%$  strain ( $\pm 15,000$  psi surface stress).

- **Endurance:** static trials included 1000 hours cycled at 10 watts per square inch, water cooled; 1000 hours continuous, plus 1000 hours cycled, at 70° C.

The mat consists of a thermo-setting, non-inflammable resin base layer, a metal

conducting element, and a thermo-setting resin covering layer, all applied by flame spray gun. Special terminals, fitted from inside the skin, transmit current to the conducting interlayer pattern.

Components are held on a worktable with a traversing gear that passes the gun across the surface at a steady, closely controlled rate to maintain uniform layer thickness. Single curvatures, airfoil, and spinner shapes are easily treated mechanically, but more complicated parts may require combined hand and mechanical working.

In a typical four-turboprop transport installation the wing, stabilizer, fin, and propeller blades are de-iced; the engine intakes, spinners, and wind screen are anti-iced. The cyclic heating ratio for de-icing is one "on," ten "off."

The leading edges of the surfaces are divided into zones by continuously heated elements (20 for the wing in order to break adhesion and so aid ice removal and prevent run-back. A fully automatic operation and thermal cut-out at 100° C. prevent damage if left "on" when on the ground.

Weight analysis of a system for this transport, 120,000 pounds gross, 130 feet span, cruising at 350 mph at 20,000 feet is as follows:

Propellers and spinners	76 pounds
Wing	398 "
Tail	61 "
Engine intakes	18 "
Power supply	379 "
Control units	132 "

**TOTAL (0.81% gross) 1,064 pounds**  
(Contd. on p. 46)



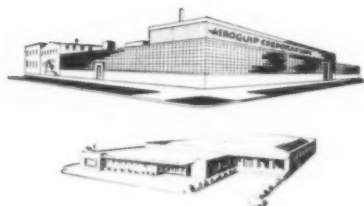
MAT CONSTRUCTION is illustrated in the cross-sectional view above.

# WHY



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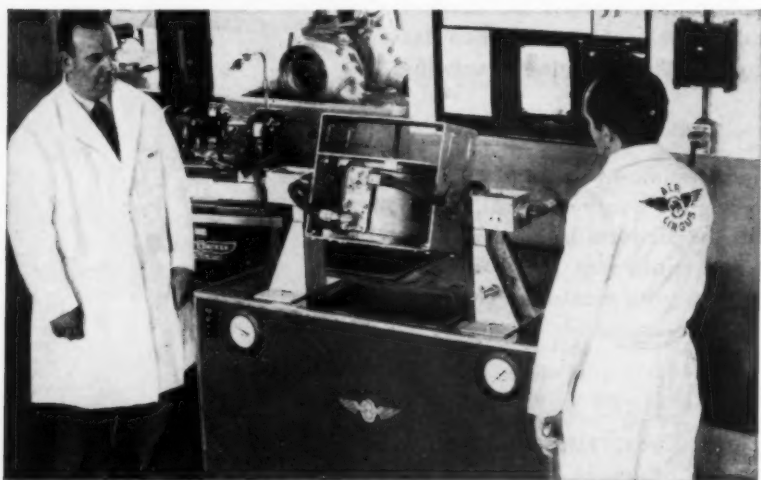
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**AERO-COUPLING CORPORATION, BURBANK, CALIFORNIA**  
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**Thermostatic control valve**, shown under test by TWA technician, controls oil supply to oil cooler. Greer's Oil Radiator Temperature Control Valve Test Stand checks its performance and dependability under low, normal and high temperatures. Same machine also tests controls that operate cowl flaps of reciprocating engines.



**Oil cooler** being cleaned and tested by Aer Lingus maintenance men. This Greer Oil Cooler Stand sends cleaning fluid through cooler at the rate of two flow reversals per minute. Its tumbling and surging actions insure complete and positive cleaning. A compressed air circuit tests for cooler leaks after cleaning.

IN KANSAS AS IN IRELAND...

## Greer Units Test Oil Cooling System

Greer precision test equipment has been proved throughout the world to give identical results regardless of place, conditions, or operator.

The standard Greer machines above do a complete test job on aircraft oil cooling systems. They work as a team to check the performance and dependability of the thermostatic control valve and the oil cooler under simulated flight.

Greer has pioneered in the standardization of test stands. Now, most machines

can be ordered directly out of a catalog. Call or write for your copy. Greer also designs and builds to meet your exact test and maintenance requirements.



**GREER HYDRAULICS INC., 454 EIGHTEENTH STREET, BROOKLYN 15, NEW YORK**  
Field Offices in Chicago, Dayton and Detroit • Representatives in principal cities in U. S. and abroad

Of this the heater mats weigh only 90 pounds.

Power requirements:

Wing	26.5 Kw	10 x 32.8 Kw
Tail	18.5 Kw	6 x 15.8 Kw
Propellers	cycled together—	4 x 12.0 Kw
Engine intakes	28.0 Kw	.....
Spinners	12.0 Kw	.....
<b>TOTALS</b>	<b>85.0 Kw</b>	<b>48.6 Kw=133.6 Kw</b>

Flight testing was carried out, first on a British Ministry of Supply Viking with a trial element on the fin and a spray rig and then as installations on York, Tempest, Canberra, and Venom aircraft. Units have been designed for a Sapphire nose fairing, and Gannet and Seamew engine intake heaters.

Napier claims that the heater mats give little trouble in service, since the bugbear of most overshoe systems, inadequate adhesion due to air inclusions, cannot occur. The resin coating—being flexible, tough, and resistant to abrasion—has a good life and visual inspection is generally sufficient. If there is any suspicion of damage, normal insulation and resistance checks can be carried out.

Repair schemes using hand guns have been prepared and an emergency field repair method is being devised.

Address: D. Napier & Son, Ltd., Dept. AAP, The Vale Acton, London W. 3, England.

## In Electronics

**Tinkertoy Kit.** Modular design kit No. PT1000 for development work in automatic production of electronic components includes special hand tools, standard tools, and accessories. Literature available.

Address: Communication Measurements Laboratory, Inc., Dept. AAP, 350 Leland Ave., Plainfield, N. J.

**Computer Component.** A lightweight, sub-miniature computer element uses no moving parts and replaces five times its weight and volume in costlier components for such purposes as multiplication or division and integration. Unit operates on the heat transfer from one element to the other, and is said to permit design of control systems for supersonic navigation, missile guidance, and machine automation that are five times more sensitive than heretofore.

Address: Arma Corp., Dept. AAP, Roosevelt Field, Garden City, N. Y.

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## Local Lines Traffic Up 15% During 1953

Scheduled U.S. local service airlines had a good year in 1953, when traffic figures for 1952 and 1953 are compared.

In 1953, the carriers completed 97% of miles scheduled, as opposed to 1952's 95.9% and hauled 15% more passengers, 11.5% more revenue passenger-miles, for a slight gain in the load factor column.

Mohawk Airlines reported a gain in load factor from 42.98% to 50.79%, to join Southwest Airways as one of the two local service lines to have a 50% or better load factor.

Cargo figures—which include air mail, air express, and air freight—also showed progress. Air freight (which only part of the group carried) was up 5%, from 1,120,583 ton-miles to 1,184,293; air express (carried by all local service operators) climbed very slightly, from 893,738 ton-miles to 955,128; and mail, helped by non-priority mail during December, 1953, climbed to over one million ton-miles for the year—up from 912,671 to 1,000,758 ton-miles, an increase of nearly 10%.

## Local Service Traffic Records

	Passenger Load Factor %		Cargo Ton-Miles		Revenue Passenger-Miles	
	1953	1952	1953	1952	1953	1952
ALLEGHENY <sup>1</sup>	42.70	39.59	199,712	181,709	31,611,000	26,798,000
BAL	38.30	38.68	74,960	54,257	15,572,000	10,751,000
BNF <sup>2</sup>	47.01	46.62	84,563	36,587	10,689,000	3,849,000
CEN	17.59	18.68	83,489	67,188	6,397,000	6,689,000
EMPIRE <sup>3</sup>	.....	36.60	.....	24,753	.....	5,622,000
FAL	35.86	34.98	592,259	602,764	33,058,000	34,025,000
LCA	23.65	24.40	103,661	70,491	8,528,000	5,481,000
MCA <sup>4</sup>	.....	41.76	.....	49,503	.....	5,665,000
MID-WEST <sup>5</sup>	.....	12.13	.....	3,406	.....	128,000
MOH <sup>6</sup>	50.79	42.98	173,118	133,787	27,366,000	25,238,000
NOR <sup>7</sup>	42.21	41.90	274,463	233,037	38,034,000	25,238,000
OZA	27.79	21.10	104,320	110,909	20,867,000	14,147,000
PAI	45.98	47.78	391,917	329,163	57,218,000	50,435,000
PAL	52.91	42.01	318,717	347,135	41,181,000	48,886,000
SOU	30.65	29.69	153,557	174,790	19,435,000	20,820,000
SWA	54.99	54.95	231,996	246,622	37,541,000	31,331,000
TTA	28.23	31.42	236,987	176,077	20,991,000	18,361,000
WCA <sup>8</sup>	35.92	42.54	114,318	81,933	29,082,000	18,674,000
WIGGINS <sup>9</sup>	19.12	18.82	2,137	2,881	186,000	313,000
TOTALS	38.63	37.89	3,140,179	2,926,992	397,756,000	346,433,000

<sup>1</sup> Formerly All American Airways. Change in name was effective February 10, 1953.

<sup>2</sup> Figures cover operations of local service route 106 operated since August 16, 1952, by Braniff Airways as result of Braniff-MCA merger.

<sup>3</sup> Figures are through July, 1952, only. Merger between West Coast Airlines and Empire Air Lines was effective August 4, 1952.

<sup>4</sup> Figures are through August 15, 1952, only and cover operations of local service route 106 (see footnote No. 2 above).

<sup>5</sup> Mid-West Airlines terminated its local service operations May 15, 1952, due to non-renewal of the line's certificate by CAB.

<sup>6</sup> Formerly Robinson Airlines Corp. Change in name was effective August 23, 1952, per CAB order E6689.

<sup>7</sup> Formerly Wisconsin Central Airlines. Change in name was effective December 16, 1952.

<sup>8</sup> Merger between West Coast Airlines and Empire Air Lines was effective August 4, 1952, West Coast being the surviving company.

<sup>9</sup> Figures for Wiggins are through July only, since company terminated operations August 1, 1953 per CAB Order E-1534.

NOTE: Above figures include both scheduled and non-scheduled operations.

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## People

### AIRLINES

**Guy M. Tomberlin**, formerly Aviation Safety Advisor to the Civil Aeronautics Administration, has been elected vice president in charge of operations of Resort Airlines.

**Mrs. T. E. Braniff** has been elected a vice president of Braniff International Airlines.

**D. Walter Swan** has been granted a leave of absence from his post as assistant to **W. A. Patterson**, president of United Air Lines, to serve as deputy assistant secretary for public affairs for the Department of Defense.



Swan



Keating

### MANUFACTURING

**Stephen F. Keating** has been appointed to the newly created post of

vice president of the Aeronautical Division of Minneapolis-Honeywell Regulator Co. Before moving up to a vice presidency, Keating was assistant general manager of the division.

**Lovell Lawrence, Jr.**, founder and former president of Reaction Motors, Inc., has joined the Chrysler Corporation as head of powerplant design in the Missile Branch of Chrysler's Engineering Division. Just prior to joining Chrysler, Lawrence was a consultant in private practice.

**R. Adm. J. A. Briggs, USN (Ret.)**, has been named special assistant to the president of Yardney Electric Corp., of New York.

**Chester D. Seftenberg**, former Deputy Assistant Secretary of the Air Force, has succeeded **Paul Moore** as treasurer of Lear, Inc. Moore will continue with Lear on a part time basis as a vice president and a member of the executive and financial committees of the company.

**Joseph T. Morris** has been named assistant vice president of United Aircraft Products, Inc. Morris, who retired from the U. S. Air Force last August after 35 years of service, was Commanding General of the Spokane Air Force Base at the time of his retirement.

**Ethridge C. Best**, formerly Director of the Electronics Division, Navy Bureau of Aeronautics, has been appointed assistant to the president of Sanders Associates, Inc.



• **W. A. Patterson**, United Air Lines President, Chicago. 25 years.

• **Ernest L. Smith**, Trans World Airlines. Account executive, San Francisco. 25 years.

• **Frank F. Formby**, Trans World Airlines. Assistant general foreman, engine overhaul shop, Kansas City. 25 years.

• **Henry G. Andrews**, Trans World Airlines. Flight dispatcher, Los Angeles. 25 years.

• **W. P. Conradt**, United Air Lines. Safetyman, San Francisco. 25 years.

• **C. W. Hudson**, United Air Lines. Captain, Los Angeles. 25 years.

• **J. H. Matucha**, United Air Lines. Budget analyst, San Francisco. 25 years.

• **R. E. Medefesser**, United Air Lines. Assistant plane overhaul manager, San Francisco. 25 years.

• **H. Schoonveld**, United Air Lines. Line maintenance coordinator, Denver. 25 years.

• **C. M. Storme**, United Air Lines. Lead shop mechanic, Chicago. 25 years.

• **J. L. Cummings**, United Air Lines. Supervisor-mechanical service. Los Angeles. 25 years.

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# AIRLINE COMMENTARY

• TRAFFIC • SALES • PUBLIC RELATIONS • by Eric Bramley

There are many problems in that twilight zone between sales and operations that haven't always received adequate attention. It's very encouraging, therefore, to note that Air Transport Association has set up a top-flight committee, composed of both operations and sales executives, to do something about some of the problems. Official name is the Airport Passenger Terminal Service Committee. Among other things, it will see what can be done about uniform industry specifications for jointly used facilities and equipment—baggage claiming areas, gate signs, passenger boarding facilities, public address systems, concessions, porter organizations, etc. It's also to look into all "problem areas" affecting service to passengers and public. Space doesn't permit listing the members, but they're all on a policy-making level. Maybe we'll see some action.

Airlines, to whom user charges for Federal airways is a touchy subject, are chuckling about the student from a Washington, D.C., university who called CAA and asked if he could have a copy of the report on "airways usury charges."

In a highly commendable move, American Airlines' sales department has surprised two AA pilots and their wives by awarding them one-week all-expense vacations at Acapulco. Without the pilots knowing it, a record was kept of complimentary letters received by AA in 1953. Coming out on top for their passenger service and public relations work aloft were Capts. Bob Baker and Dick Lee. Pilots are often criticized for not being more public relations-minded. AA now gives them an incentive.

The following amusing incident occurred at the IATA meeting a few months ago. Ray Ireland, United Air Lines' vice president-traffic, sought to catch the chairman's attention, so, using the standard procedure of giving his name and company, he called out: "Ireland—United." Came a voice from the back of the room: "I whole-heartedly support those sentiments!" Speaker was Jerry Dempsey, general manager of Irish Air Lines and strong proponent of a united Ireland. (And the thanks of our organization to Mr. Dempsey for the St. Patrick's Day card).

United Air Lines has under way an unusual campaign to reduce baggage mishandling and damage. All baggage-handling personnel are receiving twice-monthly letters, which are the "memoirs of VIB" (Very Important Baggage).

VIB, a man's two-suit, relates his travel experiences on UAL in the form of an interesting, humorous continued story. He talks, for example, about the "gor-

geous bag" (lady's overnight bag) he met in Denver, but adds that he missed a date with her in Chicago because UAL took him to Washington by mistake. Also recounts experiences of some of his friends who have been badly bashed by baggage handlers.

Congratulations to F. W. Axtell, UAL cargo service superintendent, for what should be an effective campaign.

## Baggage

## Sales, Traffic, Promotion

SAS on April 25 starts new "Inter-flight Service" with American, United, and Northwest. Domestic coach trips will connect with SAS tourist flights in and out of New York International. All check-in procedures will take place at Chicago, Detroit or Minneapolis; no formalities at New York, SAS says. "One call, one ticket, one check-in" is all that's required . . .

Pan American has started cargo reservations system (1100-lb. limit on cargo flights, 110 lbs. on passenger trips) for handling freight under same booking procedure as that for passengers.

Passengers on Delta-C&S' non-stop first-class Chicago-Miami trips can now

select, in advance of boarding, the seats they want to occupy. Selection is made from a wall chart when passengers check in at the field; first come first served. A numbered stud designating the seat is attached to the ticket. System is for convenience of passengers checking in early and wishing to avoid last-minute rush for plane . . .

American has built a \$10,000 mockup of a Flagship, which will be made available to New York television producers for aviation programs and scenes. Interior is convertible for use as a Convair, DC-6 or DC-7. AA now has complete set of TV props, including ticket office.



**The Royal Biscayne**, new Douglas DC-7 for Delta-C&S, goes through a familiar ceremony, with movie star Piper Laurie wielding the traditional bottle as the president and general manager of the airline, C. E. Woolman, looks on. Plane is the first of 10 which have been ordered by D-C&S for some \$20 million. At the right, stewardesses Mary Fondren and Janet Fairchild.



# New York-Mexico Problem Split 3 Ways

The controversy generated by CAB's authorization of American Airlines to fly non-stop between New York and Mexico City is headed for three different areas of dispute:

- **The exemption to American**, issued by a 3-2 CAB vote in January, will be argued in the U. S. Court of Appeals in April.

- **American's long-standing certificate application** to fly the non-stop on a permanent basis will be tried in a CAB case activated March 25. Apparently, so will bids of competing lines.

- **The over-all problem** of air service between the U. S. and Mexico may be aired in resumed bilateral talks between the nations in the near future.

The latter possibility is the newest development of the three, and came about when four Louisiana members of Congress called on CAB Chairman Chan Gurney to protest the lack of

air service between New Orleans and Mexico.

At that meeting, held March 17, Gurney indicated he would confer with State Department officials about resuming the Mexican talks. Negotiations broke off several years ago.

Still to be settled, however, is the status of certificates issued by CAB in 1946 authorizing Braniff, Western, and Eastern to operate routes to Mexico. In 1952, President Truman "withdrew his approval" of those certificates. However, the legality of that move is now being studied by the Department of Justice.

Meanwhile, Air France, which touched off the current dispute by activating its Mexican authorization of New York-Mexico City nonstop service, is said to be planning an increase in schedules from the present thrice-weekly service. No U.S. carrier has comparable authority.

## Merger Hinges on Prior Control Charges

Future steps in the Colonial Airlines merger situation appeared at press-time to hinge on Eastern Air Lines' "answer" to a CAB show cause order aimed at Eastern's alleged "control" over Colonial.

The order was issued one day before Colonial was scheduled to open newly solicited merger bids from Eastern and National on March 10.

That stage was set by President Eisenhower's disapproval of the Eastern-Colonial merger agreement on March 1, on grounds of unlawful prior control.

In its show cause order to Eastern, CAB indicated that it wanted to clear the air of the control issues. It gave Eastern 10 days to show why it should not be required to terminate its "control" of Colonial and why it should not be directed to cease and desist from acquiring any control of Colonial or any of its routes or assets without prior CAB approval.

Said CAB: "... it appears evident that the public interest requires clear and complete assurance that no unlawful control by Eastern within the mean-

ing of Section 408 (of the Act) will continue in existence."

Eastern, which was expected to give a detailed account of its position in answering that CAB order, stated generally in other documents that the factors which led to disapproval of the merger were "non-existent."

But Colonial officials were not prepared to go ahead without a clean bill of health from the government. They called off the opening of the new bids several hours before the deadline on March 10. In a recent document filed with CAB, Colonial said it intended to again request bids from the two carriers when the matters raised by the CAB show cause order have been "clarified."

CAB, meanwhile, has taken no action on National's petition for an immediate decision on the National-Colonial Merger Investigation, nor on motions of National and Mohawk Airlines for an order restraining Eastern from again bidding for the Colonial routes. All such actions seemed to depend on how Eastern answered the show cause order.

### CAB MISCELLANY

**Riddle Airlines** has applied for new all-cargo route between Miami, Kingston, Port-au-Prince, and San Juan, to supplement its present U.S.-San Juan service.

**U. S. Airlines** asked CAB for permanent renewal of its domestic all-

cargo certificate with authority to transport all types of traffic except passengers.

**Frontier Airlines** applied for renewal of its local service certificate for Route 73 on either a permanent basis, for 15 years, or for a period that may be determined by CAB.

## CAB NEWS

### AS OF NOW . . . .

Hearings have been completed in the **States-Alaska Case** and briefs to the examiner are scheduled for April 30. Thereafter an examiner's report, briefs to the Board, and oral argument will be necessary before CAB submits its recommendations to the White House for final action. Involved is a potentially new pattern of air service between the States and Alaska and within Alaska.

The **ACTA and IMATA Agreements Case** has been revamped by CAB order to permit more expeditious consideration of so-called "commercial charter" proposals of the two associations—Aircoach Transport Association and Independent Military Air Transport Association. The "commercial charter" proposals, which basically involve a new type function for the associations, originally were lumped in an overall investigation of all resolutions and agreements of the two groups.

Also being re-studied is the **ATC Agency Resolutions Case** which centers around conference resolutions which, among other things, would put a \$1.50 maximum on agency commissions for one-way domestic sales. A second pre-hearing conference was ordered for late this month as the original unanimous airline front favoring the resolution appeared to be disintegrating. The new commissions have never become effective pending settlement of the CAB case.

### RECENT CAB DECISIONS

- **Mohawk Airlines** ordered to show cause why final annual mail pay should not be increased about \$200,000 to \$1,166,570, reflecting service increase of about one million plane-miles annually over 1952.

- **British Overseas Airways Corporation's** U. S.-Nassau foreign permit amended to include Bimini, Bahama Islands, as a co-terminal with Nassau and Grand Bahama Island.

- **Ozark Airlines** granted temporary exemption to continue service to Columbia, Mo., after service to alternate Jefferson City is started, pending outcome of Ozark Renewal Case.

- **Peruvian International Airways** (inactive in U. S. since 1949) directed to show cause why U. S.-Peru permit should not be revoked.

### CAB CALENDAR

**Apr. 12**—Hearing in Chicago-Detroit Local Service Investigation. Washington, D. C. Docket 6411 et al.

**Apr. 13**—Hearing in Aero Finance Corporation Enforcement Proceeding. Washington, D. C. Docket 5779.

**May 3**—Hearing in Continental-Pioneer Merger Case and Continental-Braniff Merger Investigation. Washington, D. C. Docket 6457 et al.

**May 4**—Hearing in Denver Service Case (TWA, et al.) Denver, Colorado. Docket 1841 et al.

# INTERNATIONAL AVIATION

Edited by Anthony Vandyk



## INTERCOM

Desperate shortage of skilled manpower is a major headache for the Royal Air Force these days. One solution that has been discussed involves a drastic extension of the repair-by-replacement system. The ideal would be to design and build aircraft in completely functional units that would be fully tested in the factory and merely require bolting together. For instance a damaged fighter wing would not be repaired at the air base but would be removed and replaced by a new wing complete with landing gear, guns, electrics, hydraulics, etc. All that would be required would be for the new wing to be bolted on and the lines connected up. No functional tests would be needed since these would have been done at the factory.

For a lesson on how to achieve high load factors the year round take a look at Iberia's operations. Despite a fleet of obsolescent aircraft (DC-4, DC-3, Bristol 170, and de Havilland Dragon Rapide) the Spanish carrier's average passenger load factor never fell below 62% in 1953, even in the slackest months. In eight of the twelve months the figure was over 75% and in four it was over 80%.

Highest load factors were recorded on domestic routes and on services between Spanish territories overseas. Between Madrid and Barcelona, for example, Iberia carried 69,019 passengers at an average load factor of 88.2%. The busiest route of all was the trans-Mediterranean service between Barcelona and Palma (Majorca) which was used by 96,862 passengers in 1953; load factor was 87.1%.

As explained in AMERICAN AVIATION of September 28, Iberia's heavy 1953 domestic traffic results partly from Spain's poor surface communication. Nevertheless Iberia's achievement is significant in view of the poverty of the Spanish people: there are few countries in Europe where the "time is money" factor is less applicable than it is in Spain.

## Ambassadors Present Note to State Dept.

An unprecedented move in the history of inter-governmental aviation relations occurred in Washington this month when the ambassadors of Denmark, Norway, and Sweden visited the State Department to hand a note to acting Secretary of State Walter Bedell Smith asking for a "change in attitude" in the U. S. Government's views on west coast terminals for the Scandinavian Airlines System.

The joint visit to the State Department represented the highest-level measure yet to enable SAS to start its "trans-polar" route from Scandinavia to the west coast via Greenland and Edmonton, Alberta.

The SAS view is that it must have terminal rights in San Francisco and

Los Angeles, whereas the State Department is not willing to make available any west coast terminal other than Seattle.

SAS has established that the route could not be put on an economically sound basis with Seattle as the terminal, and therefore the whole future of the "trans-polar" service hinges on the results of the ambassadors' plea for a change in U. S. thinking.

The State Department claims that its decision to offer only Seattle "represents the views of the several government agencies involved and is believed to be necessary in order to afford adequate protection to the U. S. transport industry."

## Missile Wind Tunnel Built by Bristol

More indications of the trend of guided missile development work in Britain (AMERICAN AVIATION, March 1) are disclosed with the news that the wind tunnel at the Bristol Aeroplane Co. is designed for testing missiles over a speed range from Mach 1.7 to Mach 3.5. New facilities are being installed to adapt the tunnel, which is the largest privately owned supersonic tunnel in Britain, for transonic speeds (between

Mach 0.9 and Mach 1.5).

It has also been revealed that Vickers-Armstrong now has a high-altitude "stratosphere" chamber at its Weybridge plant where guided missile structures and equipment can be ground tested at equivalent heights of up to 80,000 feet and temperatures down to -65° C. Cooling is achieved by circulating 20,000 gallons of refrigerated methanol fluid around it each hour.



**Latest "All-Argentine"** twin-engine plane is the IA-35 built by the Empresa Industrias Aeronauticas y Mecanicas del Estado (IAME) at Cordoba. This reconnaissance/trainer aircraft has now completed all its tests and is to go into production for the Argentine Air Force. Both the airframe and its powerplant—the 650-hp El Indio radial—were designed and built by IAME, and it is claimed that no foreign parts are used in either.

# INTERNATIONAL AVIATION

## MANUFACTURING

**JAPAN:** The first Japanese-built helicopter—a Bell 47D-1 manufactured under license by Kawasaki Machine Works—has been delivered to the Japanese National Security Force. The Kawasaki production line is gradually being converted to the Bell 47G and monthly production of five of these rotorcraft is contemplated. Sale of Kawasaki-built helicopters is restricted to Japan, India, Formosa, Burma, Pakistan, Philippines, and Korea.

**BRITAIN:** Bristol Aeroplane Co. has received a production contract for a small number of twin-engine Bristol 173 helicopters for anti-submarine use by the Royal Navy. The order brightens the commercial prospect for the model, which was primarily designed as a transport.

**ITALY:** Agusta is expected to deliver its first license-built Bell 47D-1 in May. The Italian Air Ministry has ordered 20. By 1955 Agusta's helicopter line will be producing the Bell 47G model.

**SPAIN:** AISA has had its government order for 150 I-115 trainers increased to 200 aircraft. Its order for the I-11 light-plane has been boosted to about 100 planes.

**SWEDEN:** Saab-32 Lansen transonic all-weather fighter will probably carry guided missiles now reported under development in Sweden. The first of several prototypes of the Avon-powered two-place plane made its first flight in November, 1952. Production planes should reach the Swedish Air Force next year.

**GERMANY:** Daimler-Benz plans to build Turbomeca gas turbines under license as soon as Germany is allowed to resume aircraft production.

## MILITARY

**NETHERLANDS:** Dutch navy recently received six Convair PBV's from the Australian government for use in Dutch New Guinea. Some Martin PBM's may be bought for operation in the area.

**SPAIN:** Spanish Air Force is getting some Grumman SA-16 amphibians and is hoping to obtain North American F-86's as a result of the defense pact with the U.S. The Portuguese Air Force is getting SA-16's under MDAP.



**INDIA:** First batch of the 26 Fairchild C-119 transports bought by the Indian Air Force has reached Delhi.

**SWITZERLAND:** Swiss Air Force is considering procurement of new trainers. Choice is understood to be between the Percival Provost and the Fouga Magister.

**SWEDEN:** Purchase by the Swedish Air Force of about 200 Hunters or Swifts is highly probable. Other foreign aircraft likely to be bought include the de Havilland-Canada Otter transport, about 40 to 50 of which would be ordered.

**RUSSIA:** The Red Air Force now has 20,000 combat planes and the Soviet navy has 3000 aircraft, according to an official British estimate.

**DENMARK:** Danish Air Force pilots will train in Canada instead of the U.S., effective May. Requirement is for 100 to 200 new pilots each year.

## AIRLINES

**NETHERLANDS:** Lt. General I. A. Aler, until recently commanding general of the Dutch Air Force, is to succeed the late Albert Plesman as president of KLM Royal Dutch Airlines effective May 1. Until then he will act as executive vice president.

**BELGIUM:** SABENA Belgian Airlines has ordered an additional DC-6B for delivery in 1955 (supplementing eight already delivered and two DC-6C's to be received this summer). Carrier will start passenger helicopter service to three more Western German cities shortly—Essen, Duisburg and Krefeld.

**AUSTRALIA:** Qantas Empire Airways will get its first Lockheed Super Constellation in April and three more before the end of the year. Another four will be delivered in 1955. Planes will be used on the Sydney-London route and subsequently on the trans-Pacific route to San Francisco which QEA is expected to take over from British Commonwealth Pacific Airlines.

Ansett Empire Airways has ordered a Convair 340 and is expected to buy two more. It currently operates six DC-3's.

**LIBYA:** Libyan Airways, subsidiary of Britain's Silver City Airways, has suspended operations.



**Trainers from Japan and Spain** are illustrated above. On the left is the Kawasaki KAT-1, which has now completed its initial flight test program. The Japanese National Security Force is to choose between this model and the Beech T-34A Mentor; Fuji Heavy Industries is to build a batch of 30 T-34A's this year. On the right is Spain's latest advanced trainer, the Hispano HA-100-EI powered by a 750-hp ENMASA Beta. Grossing 6010 pounds, it has a top speed of 290 mph and a range of 820 miles.



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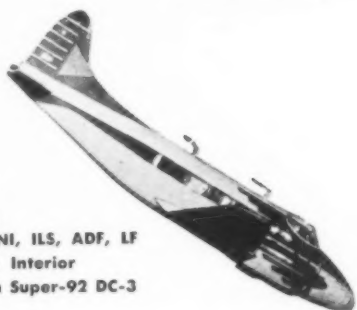
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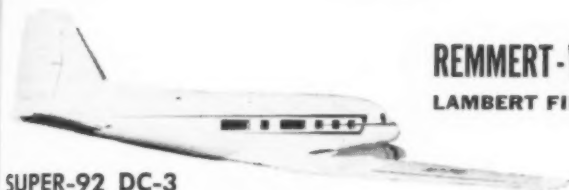
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## En Route



**Les Ouled Nails.** It's time to clean out the sand from between your wrinkled old toes and gather at the foot of the date palm trees. Old Pappy Parrish wants to tell you more about that oasis in the Sahara called Bou Saada. Been sparrin' around long enough.

Seems that for a long, long time Bou Saada has been renowned as the home of some Arab dancing girls called the Ouled Nail. (Best pronunciation I heard sounds like Ouled Nah-eel, but who asked for their names, anyway?)

These Ouled Nail gals are famed far and wide throughout North Africa for their erotic techniques in the terpsichorean arts.

Seems that they are picked out at the age of four or five to learn the routine. They're trained and nurtured, by whom I never learned, and when they come of age, which is pretty cockeyed early in the Arab world, they're ready to put on performances.

**Gold Coins.** The better they dance, the more money they earn, and I would be the last to suggest that dancing is the sole source of income. They turn the money into gold coins which they string on necklaces and if you see a gal with about three or four strands of gold coins around her neck you know that she has been quite a success in her part of the world.

The reason they have to make money is because they have to buy a husband and even in Africa a husband can come pretty high. This idea of making the gals put up dough for a hubble is not so bad in my books and maybe here is an Arab custom that could stand being adopted in other parts of the world.

I reckon the idea wouldn't be so appealing to the Western female, however, because in addition to buying a husband the Arab gal virtually excludes herself from the world after she buys one. Seems that once the Arab gal is married her husband keeps her strictly out of circulation and on the few occasions when she's permitted outside the house she has to wear a veil.

**Life Begins Early.** The prime of life for these dancing girls is between eleven and fifteen. By the time they're fifteen they are a little old and plump for dancing so they get married and raise a lot of kids and by the age of twenty to twenty-five they're really on the old side.

The life span comes and goes pretty rapidly but if you saw the kind of life they lead in Arab communities you'd well understand that anybody who lives

beyond the age of five is doing pretty well. If sanitation ever hit the Arab world, thereby increasing the span of life, the Arabs would out-populate the rest of us in short order.

Anyway, our Air France press party was all hepped up over the plans to see these Ouled Nail gals do these exotic dances. There were even whispers, shocking as this may come to you, that we might even see these girls dance in the nude. Yep, without any clothes on. Just why anyone should be thrilled at seeing these teen-age Arab gals in the nude when we had just arrived from the world's most undressed city of Paris I'll never know. But anticipation is, as they say . . . well, let's get ahead with the story.



**My Arab Friend.** Our party had arrived at noon so as soon as we had had lunch we were to go riding on camels and get our pictures taken doing same. Those flea-bitten beasts of burden never much appealed to me outside of a circus parade, so I decided to lag behind. As soon as our party was out of sight, I stepped out of the hotel and started out to see the town on my own.

You don't take many steps in an Arab town, however, without having an Arab attach himself to you. First he wants to sell souvenirs. Next he wants to be your guide. It's all but impossible to shake him. Insult him, yell at him, cuss him out, or give him the silent treatment, you can't discourage him as long as he knows you're a tourist.

So one attached himself to me. At first I tried to ditch him by ducking into shops, but no good. He was always sitting on his haunches outside with a wide toothless grin, waiting for me. So I decided to reverse the procedure by attaching myself to him. After all, once you get attached he keeps all others away and it's cheaper and more efficient in the long run.

**Bargaining Begins.** By the end of the day my Arab friend and I were fast friends. His teeth were about gone.

His red fez was somewhat worn. Underneath his once-white gown was a vestment of knitted blue which must have been quite attractive when it was new and clean. But he spoke very good English, which he said he had learned while acting as an extra in Hollywood, a story as unlikely as it was romantic.

It was a sunny, lazy afternoon in this town of one- and two-story buildings. Obviously Bou Saada is a trading center for a wide area of desert and most of the shops sold or traded in the kind of staple items you'd find in many an agricultural community. Date palms, chickens, and sheep seemed to be local products. The street traffic consisted of some cars, trucks, donkeys and camels. A few shops sold tourist items of poor quality and variety.

As we walked slowly along the main drag my Arab friend kept up a steady stream of conversation and it wasn't long until he wanted to know if I would like to see the Ouled Nail dancing girls. I told him I was going to see them that night. He said he knew all about that but the girls were coming to the hotel and would dance with their clothes on while our party had dinner. He said he could arrange a "real" show for me that afternoon.

Ah, I thought, the come-on. But I must admit I had not been prepared for seeing the Ouled Nail dancers at our hotel. That was too, too much. Just like seeing the Casbah in a tour. Had I come so far for so little?

**We Make a Deal.** So that's how it all began, but I was careful to show studied indifference to my Arab pal. I said it was all the same, hotel or not, and anyway a private showing would cost too much money. My friend thought that over very carefully and after deep contemplation finally asked, hesitantly, if I thought that four hundred francs would be too much. A quick calculation revealed that this would be the munificent sum of \$1.25, but I whistled a little and replied that 400 francs was a lot of money just to see some girls dance. It would have to be an awfully good show for that much money, I said.

We bantered back and forth and I turned down the offer several times but finally said I might agree, on several conditions.

One was that the price was fixed—absolutely not a franc more than 400. Second, he was to be in complete charge and was to act as my agent, not the gals. Third, if the show was really good, I would get some of my friends together that night, after the hotel show, and we'd have a real whing-ding and he could collect the full going commission rate.

My friend's eyes began to sparkle in the manner of all hot salesmen on the scent of a big deal.

So in mid-afternoon in this oasis of Bou Saada, my Arab friend in his fez and gown, and old Pappy Parrish with a business suit, light topcoat and hat (it was a little cool), made our way through a labyrinth of unpaved narrow passageways, stepping around mud holes and manure, until we reached a narrow street of whitewashed houses. I looked up to see a sign reading "Rue des Ouled Nails." This was it. Time for bed, kiddies. Next installment next issue.

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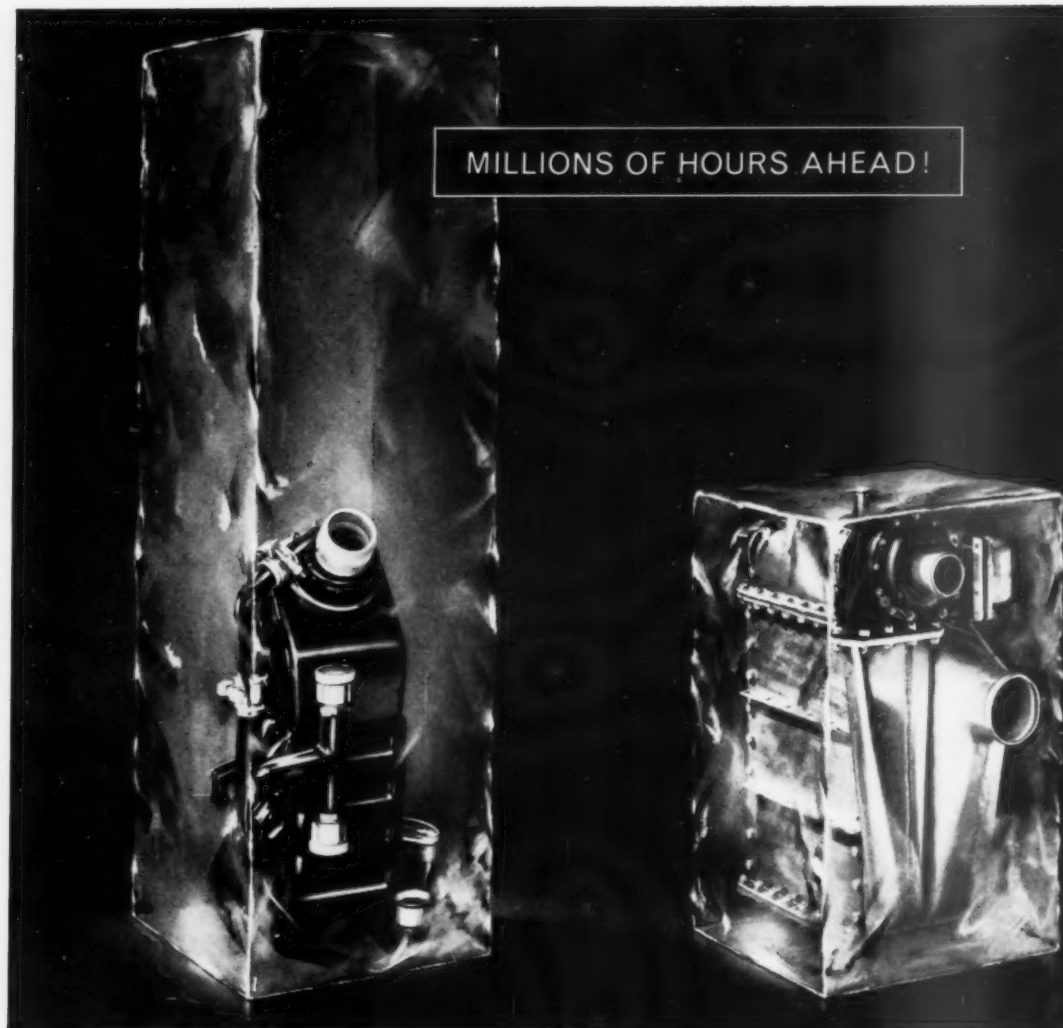
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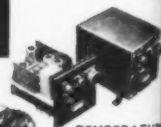
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# News at Deadline

## Twining Sees Atomic Plane in Few Years

The next few years should see an atomic airplane flying, according to Gen. Nathan F. Twining, USAF Chief of Staff. "The achievement," said Twining, "for the next few years, will overshadow all other useful applications of atomic power. The atomic-powered airplane will revolutionize air transport to a degree far exceeding the current revolution brought on by the jet engine."

Twining, speaking before the Los Angeles World Affairs Council, emphasized that the industry's vital role in national defense was appreciated, and that a slump like those which have followed recent wars should not occur again. Part of the program for avoiding such a slump would be a development of the commercial aircraft market:

"A strong civil air transport industry is a vital part of national defense. In time of war, air transportation is at a premium . . . The Air Force is engaged in tests that will demonstrate where and how air transport is the most economical means of delivery for all but the very heaviest and bulkiest types of military cargo.

"We are now engaged in a program which we hope will demonstrate to stubborn skeptics that large-scale movement of supplies and equipment is profitable in peace, as well as vital in war."

Twining noted that even after the peak of the present production effort has been passed, the maintenance of a 137-wing Air Force would require annual expenditures for new planes "comparable to the entire Air Force budget of 1950." USAF spending in 1950 totaled \$4.1 billion.

## Turbine Rotor Missing From Wrecked Comet

A turbine rotor disk has been discovered missing from one of the engines of the BOAC Comet which crashed into the sea off the island of Elba on January 10. The missing rotor, which was discovered when the engines were finally raised from the floor of the sea, was termed the most significant clue to the crash thus far uncovered.

One of the modifications incorporated in the Comet after a post-crash investigation was the fitting of armor-plate shields between the zone of the turbine blades and the fuel tanks.

## Atlas Corp. Buys Northrop Stock

Floyd Odlum's Atlas Corp., which gave up control of Consolidated Vultee to the General Dynamics Corp. early last year, acquired 31,900 common shares of Northrop Aircraft during that year, according to the holding company's annual report.

Also added to the Atlas portfolio last year were 21,000 shares of General Dynamics, 5000 each of Lockheed and North American, 3000 of Boeing, and 2000 of Douglas.

Net profit for Atlas during 1953 was reported at \$8.5 million, up from \$4.3 million in 1952.

## Allison T-56 Tests Run with Super Connie

Flight tests of the Allison T-56 turboprop engine are being conducted with the engine in the number four position on the prototype Lockheed Super Constellation. The other three engines on the aircraft are Turbo-Com-pounds.

A new tail assembly and a new fuselage skin have been fitted to the prototype in order to allow for the greater stresses which will result from the various engines and propellers that will be tested.

The T-56 will power Lockheed's forthcoming C-130A transport.

## Unions Urged to Move Cautiously

If aircraft workers expect any change for the better in their situation they must achieve it by means of a change of Administration in the White House rather than by reliance on strikes or the threat of strikes, delegates to the UAW-CIO's National Aircraft Department convention have been told.

Caution on resorting to strikes was urged by John W. Livingston, UAW vice president and head of the Aircraft Department, who warned that the unsuccessful strike against North American last year had set an unfortunate precedent. "Anytime we go on strike" in the future, he declared, "I want to be convinced that we have a good chance to win."

"I know that [J. H.] Kindleberger is the hero of the industry," he observed.

## ACC Announces Support of NAVARHO

In a major revision of U. S. policy on long distance navigation aides in ICAO, the Air Coordinating Committee has announced support of NAVARHO, a recently de-classified USAF system developed by Federal Telecommunications Laboratories, Inc.

According to ACC, the U. S. policy will be to complete development and to perform extensive evaluation of NAVARHO, and to make the results available to other ICAO member governments. U. S. policy for the present will be:

- Continued operation and expansion of LORAN as required.
- Installation and operation of non-directional radio beacons where needed and adequate.
- Acceptance and support of limited CONSOL installations based on operational requirements.
- Engineering of new CONSOL stations, directed toward integration into the standardized system.
- Avoidance of duplication of long range aids to maximum extent possible.

## DC-7 Flight Time Investigated by CAA

Charges that American Airlines flight crews are being worked longer than the eight hours permitted by the CAR's because of the failure of DC-7's to make the flight between New York and Los Angeles in the scheduled time are being documented by CAA's Office of Aviation Safety in Washington.

Further action is expected within a week. Alternatives for AA would be the use of a complete second flight crew or the obtaining of a waiver from CAB for those instances in which the flight is not made in the scheduled time.

## New Fire Control System from GE

A new fire control system for supersonic aircraft has been developed by the General Electric Company. The system is said to be capable of locking on an enemy aircraft, guiding the interceptor or fighter to a firing position, and then operating the guns. A Navy Douglas experimental aircraft is being used for tests of the system.



## Taylor Named New ANDB Director

In a joint commerce-defense department announcement, Col. J. Francis Taylor, USAF, has been named the new director of the Air Navigation Development Board, to succeed D. K. Martin. Former chief of the air force All-Weather Flying Division, Taylor will be placed on special assignment to devote his full time to direction of the ANDB program.

## Symington Hits USAF Cuts, Concentration

Sen. Stuart Symington has accused the Administration of putting "figures before forces" in planning its buildup of military might. The Missouri Democrat also blasted "the steady concentration of the nation's industrial base on grounds of economy."

The former USAF Secretary condemned what he termed the "classification of documents to hide mistakes" and to prevent both sides of the story from being heard.

He cited Defense Secretary Wilson's statements that the Reds are building primarily a defensive air force and contrasted them with published reports of Russian long and medium range bombers, atom bombs, and hydrogen bombs.

Symington said he was still worried about the cut of \$5 billion in USAF funds in the fiscal 1954 budget, adding that Pentagon leaders' current emphasis on carryover funds means they "practically admit the mistakes made last year." He added he was not yet certain of the fiscal 1955 budget, but was suspicious of the manner in which military and civilian defense leaders are pointing to 1955 expenditures rather than new money to back up their statements that air power is being pushed.

## Airlines Settle CRAF Agreement Procedure

The procedure for writing a uniform stand-by agreement in connection with airline participation in the Civil Reserve Air Fleet has been decided upon by airline representatives meeting at Air Materiel Command headquarters.

The agreement arrived at by such a procedure would be negotiated, signed, and executed by each carrier individually. Most of the legal work in connection with the drafting of a uniform agreement will be done by a newly formed nine-man executive committee of airline members.

## United Aircraft, G-D Announce 1953 Profits

Last year brought the United Aircraft Corp. sales totaling \$817.6 million and brought the General Dynamics Corp. a record sales figure of over \$200 million.

Both firms were up from the 1952 figures, which had been reported at \$667.8 million and \$134.5 million, respectively.

General Dynamics reports a current backlog of \$280 million; United Aircraft cites a figure of \$1.5 billion as of the end of the year.

Among the developments cited by United Aircraft chairman Frederick B. Rentschler, and president H. M. Horner were the placing in production of the 10,000-pound thrust J57 engine, research on an atomic powerplant, wider use of Hamilton Standard propellers, testing of the twin-engine Sikorsky S-56 helicopter, and the development of a successor to the Navy's Cutlass by Chance Vought Aircraft.

## Committee to Try DME-TACAN Compromise

By the end of July the wrangle over the respective merits of the VOR/DME and TACAN navigation systems may have been settled by the ANDB. A special advisory committee has been appointed to resolve the differences.

Similar committees, meeting in the past, have arrived at stalemates, presumably because the TACAN system was not evaluated. Members of the new committee, after being cleared for security, will have the TACAN report presented to them. A compromise that will be satisfactory to both the military and civil interests is hoped for.

The Department of Commerce will be asked to indicate just how satisfactory TACAN would be, and the military services will be asked for a similar evaluation of DME.

## Kaman Sales Up, Earnings Down

Kaman Aircraft Corp. has described 1953 as the "most successful in the history of [the] company" despite a drop in earnings from \$246,063 to \$206,853. The drop was attributed to the excess profits tax. Sales for the year rose from \$7.3 million (1952) to \$11.7 million. Current backlog is \$30 million, and the firm predicts that, with the elimination of the excess profits tax, income this year should exceed last year's.

## Net Earnings Off for United and Western

Despite record 1953 revenues and traffic, United Air Lines and Western Air Lines have reported net earnings that were less than 1952.

UAL described 1953 as "a year of narrowing profit margins, in which rising costs outpaced increased revenues and in which earnings declined." WAL attributed the drop in net to costs incident to integration of the new fleet of DC-6B's and inauguration of new routes and services.

• UAL's 1953 earnings were \$9,072,382, or \$3.29 a common share, against \$10,683,820, or \$4.03, in 1952. WAL's profit was \$1,184,864 (\$1.66 a share) against \$1,232,114 (\$1.72).

Expenses rose 14% to \$153,941,064 while revenues gained 9% to \$172,967,280, UAL said. Wages were up \$5 million over 1952, gas costs \$1.1 million, depreciation \$4,190,000.

Company's revenue passenger-miles increased 13% to 2,717,408,000; express ton-miles rose 3% to 10,596,000; freight ton-miles were up 3% to 28,137,000, while mail ton-miles dropped 4% to 20,850,000. UAL carried 3,951,000 passengers against 3,448,000 in 1952. Air coach accounted for 21% of passenger-miles and 17% of passenger revenue.

W. A. Patterson, UAL president, said there is "some question as to how long the present economy and efficiency of air transportation can be offered the public without some upward adjustment of rates." He stated that there is almost a 30% differential between coach and first-class fares, and added that coach should be raised.

• WAL's revenue rose 23% to a record \$22,876,797; expenses increased 29% to \$20,385,466. Operating expenses per available ton-mile flown dropped from 32.5¢ in 1952 to 29.7¢ last year.

WAL carried 838,732 passengers against 774,079 in 1952. Express, freight and mail accounted for \$846,063 revenue, up 28%. WAL received non-subsidy mail pay of \$875,587, representing 3.8% of operating revenues.

## Johnson Named Air Cargo President

Earl Dallam Johnson, president of the Air Transport Association, has been elected president and a director of Air Cargo, Inc. Other ACI officers re-elected are Emery F. Johnson, vice president and general manager; R. S. Bernhard, secretary and counsel; and M. L. Clements, treasurer.

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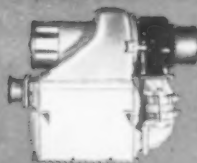
S60-5 Cabin Supercharger



S60-11 Cabin Supercharger



D60 Air Cycle  
Refrigeration Turbine



HUR60 Cooling Package



N15 Refrigeration Turbine



TP15 Air Turbine Drive



# Chance Vought puts the Navy in the Air

## 1917-1954



**CHANCE M. VOUGHT**, as one of the early Wright pilots, began flying in 1910. He was a protege of Orville Wright and is shown here in one of the earliest Wright planes, in which he learned to fly. As he pursued the field of aeronautics, Chance Vought became one of the country's top-ranking airplane designers and builders.

The name Chance Vought—a leader in the aircraft industry since 1917—has been synonymous with Naval Aviation for decades! The Navy's first aircraft carrier was equipped with Chance Vought VE-9's; a Chance Vought airplane was the first to be accepted by the Navy for regular service aboard battleships and cruisers; and Chance Vought was the first to produce a successful float monoplane for catapult operation. Photo below shows one of the early Vought seaplanes being launched from the U. S. S. Oklahoma.



**THE F7U-3 CUTLASS**, the Navy's new swept wing jet, produced by Chance Vought, was designed as a high-performance, hard-hitting carrier-based fighter.

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